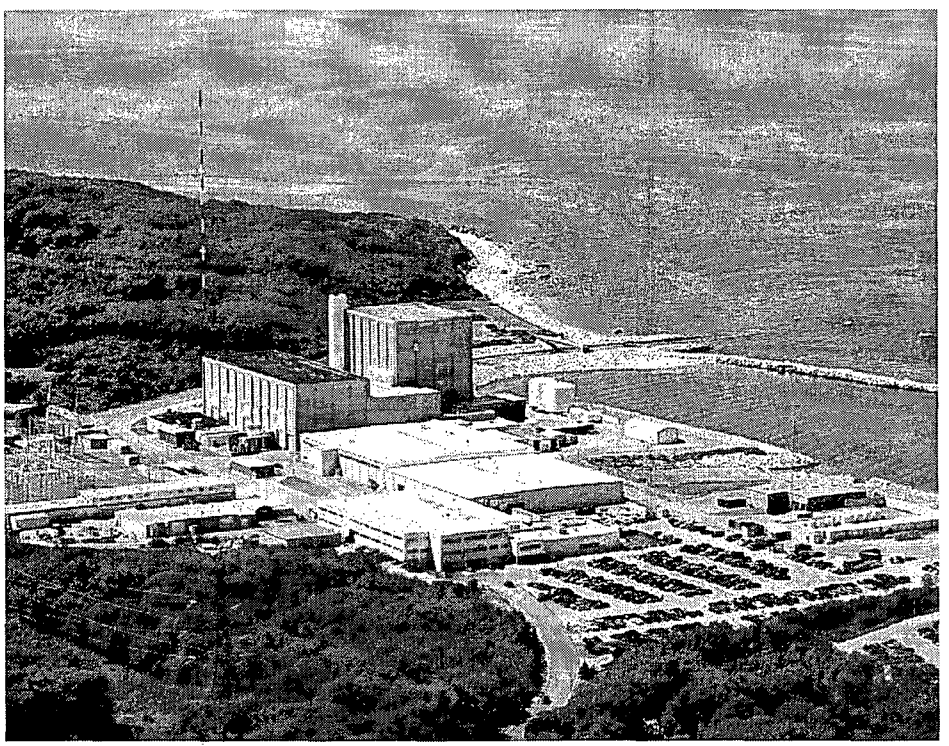
*Document E11-5690-003*

# PRELIMINARY DECOMMISSIONING COST ANALYSIS

## for the

# PILGRIM NUCLEAR POWER STATION



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**July 2008**

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| No. | CRA No. | Date | Item Revised | Reason for Revision |
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| | | 07-16-2008 | | |

# 1. DECOMMISSIONING COST ANALYSIS

This document presents the cost to decommission the Pilgrim Nuclear Power Station (Pilgrim) assuming a cessation of operations after a nominal 40-year operating life in 2012. In accordance with the requirements of 10 CFR 50.75(f)(3), the cost estimate includes an assessment of the major factors that could affect the cost to decommission the Pilgrim nuclear unit.

The costs (presented in 2007 dollars) are based upon a site-specific estimate originally prepared in 2005 for Entergy Nuclear. The 2005 estimate reflected a 60-year operating life scenario, with shutdown in 2032 followed by prompt decommissioning. The scenario was revised in 2006 for a 40-year operating life and deferred decommissioning. The revised estimate was used as the basis for the Company's spent fuel management plan filed in 2007 (in accordance with 10 CFR 50.54(bb)).[1]

The estimate presented in this document escalates the 2006 cost estimate to 2007 dollars for consistent year comparison with the Company's latest filing on the status of the Pilgrim Station decommissioning trust fund.[2]

The current cost to decommission Pilgrim is estimated at $914.4 million (in 2007 dollars). The cost includes the monies anticipated to be spent for operating license termination, spent fuel storage and site restoration activities. The cost is based on several key assumptions in areas of regulation, component characterization, high-level radioactive waste management, low-level radioactive waste disposal, performance uncertainties (contingency) and site restoration requirements. Many of these assumptions are discussed in more detail in this document.

It is the current plan, based on the growth of the funds in the Pilgrim decommissioning trust, to fund the expenditures for license termination and spent fuel management from the currently existing decommissioning trust fund and from proceeds from spent fuel litigation against the Department of Energy (DOE). Expenditures from the trust fund for the management of the spent fuel, until it can be transferred to the DOE, will not reduce the value of the decommissioning trust fund to below the amount necessary to place and maintain the reactor in safe storage and will not adversely affect the licensee's ability to ultimately release the site and terminate the license. The licensee acknowledges that it may be necessary to request an exemption pursuant to 10 CFR 50.12(a) to use trust funds for anything beyond decommissioning activities as defined in 10 CFR 50.2.

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1 Entergy Nuclear Operations submittal of its "Spent Fuel Management Plan" to the Nuclear Regulatory Commission, Letter No. 2.07.055, dated June 7, 2007

2 Entergy Nuclear Operations submittal of its "Decommissioning Fund Status Report" to the Nuclear Regulatory Commission, Letter No. ENOC-08-00018, dated March 26, 2008

## 1.1 DECOMMISSIONING ALTERNATIVES

The Nuclear Regulatory Commission (NRC) provided general decommissioning guidance in a rule adopted on June 27, 1988.[3] In this rule, the NRC set forth technical and financial criteria for decommissioning licensed nuclear facilities. The regulations addressed planning needs, timing, funding methods, and environmental review requirements for decommissioning. The rule also defined three decommissioning alternatives as being acceptable to the NRC: DECON, SAFSTOR, and ENTOMB.

DECON is defined as "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations."[4]

SAFSTOR is defined as "the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use."[5] Decommissioning is to be completed within 60 years, although longer time periods will be considered when necessary to protect public health and safety.

ENTOMB is defined as "the alternative in which radioactive contaminants are encased in a structurally long-lived material, such as concrete; the entombed structure is appropriately maintained and continued surveillance is carried out until the radioactive material decays to a level permitting unrestricted release of the property."[6] As with the SAFSTOR alternative, decommissioning is currently required to be completed within 60 years.

## 1.2 REGULATORY GUIDANCE

In 1996, the NRC published revisions to its general requirements for decommissioning nuclear power plants to clarify ambiguities and codify procedures and terminology as a means of enhancing efficiency and uniformity in

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3 U.S. Code of Federal Regulations, Title 10, Parts 30, 40, 50, 51, 70 and 72 "General Requirements for Decommissioning Nuclear Facilities," Nuclear Regulatory Commission, Federal Register Volume 53, Number 123 (p 24018 et seq.), June 27, 1988.

4 Ibid. Page FR24022, Column 3

5 Ibid.

6 Ibid. Page FR24023, Column 2

the decommissioning process.[7] The amendments allow for greater public participation and better define the transition process from operations to decommissioning. Regulatory Guide 1.184, issued in July 2000, further described the methods and procedures that are acceptable to the NRC staff for implementing the requirements of the 1996 revised rule that relate to the initial activities and the major phases of the decommissioning process. The Pilgrim cost estimate follows the general guidance and sequence presented in the amended regulations.

## 1.3 BASIS OF COST ESTIMATE

For the purpose of the analysis, Pilgrim is assumed to cease operations in June 2012 after 40 years of operations. The unit would then be placed in safe-storage (SAFSTOR), with the spent fuel relocated to an Independent Spent Fuel Storage Installation (ISFSI) to await the transfer to a Department of Energy (DOE) facility. Based upon a 2017 start date for the pickup of spent fuel from the commercial industry, Entergy anticipates that the removal of the Pilgrim fuel from the site could be completed by the year 2042. At that time, the plant would be decommissioned and the site released for alternative use without restriction. This sequence of events is delineated in Figure 1 along with major milestone dates.

The 2005 estimate was developed using the site-specific, technical information relied upon in the decommissioning assessment prepared in 2002.[8] The site-specific considerations and assumptions used in the previous evaluation were revisited. Modifications were incorporated where new information was available or experience from recent decommissioning projects provided viable alternatives or improved processes.

The 2005 estimate evaluated a scenario based upon renewal of the operating license with operations continuing through 2032. At that time the unit would be promptly decommissioned. In 2006, the estimate was revised to reflect its current operating license (without license renewal) and a 2012 shutdown date. Economic components of the estimate were escalated to 2006 dollars and the spent fuel management plan modified for an earlier shutdown date. The current estimate escalates the 2006 base year estimate to 2007 dollars. No other changes were made to the 2006 estimate for purposes of this analysis.

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7 U.S. Code of Federal Regulations, Title 10, Parts 2, 50, and 51, "Decommissioning of Nuclear Power Reactors," Nuclear Regulatory Commission, Federal Register Volume 61, (p 39278 et seq.), July 29, 1996.

8 TLG Document No. E11-1430-002, December 19, 2002

## 1.4 METHODOLOGY

The methodology used to develop the estimate followed the basic approach originally presented in the AIF/NESP-036 study report, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates,"[9] and the DOE "Decommissioning Handbook."[10] These documents present a unit cost factor method for estimating decommissioning activity costs that simplifies the calculations. Unit factors for concrete removal ($/cubic yard), steel removal ($/ton), and cutting costs ($/inch) were developed using local labor rates. The activity-dependent costs were then estimated with the item quantities (cubic yards and tons), developed from plant drawings and inventory documents. Removal rates and material costs for the conventional disposition of components and structures relied upon information available in the industry publication, "Building Construction Cost Data," published by R.S. Means.[11]

The unit factor method provides a demonstrable basis for establishing reliable cost estimates. The detail provided in the unit factors, including activity duration, labor costs (by craft), and equipment and consumable costs, ensures that essential elements have not been omitted.

This analysis reflected lessons learned from TLG's involvement in the Shippingport Station decommissioning, completed in 1989, as well as the decommissioning of the Cintichem reactor, hot cells, and associated facilities, completed in 1997. In addition, the planning and engineering for the Pathfinder, Shoreham, Rancho Seco, Trojan, Yankee Rowe, Big Rock Point, Maine Yankee, Humboldt Bay-3, Connecticut Yankee, and San Onofre-1 nuclear units have provided additional insight into the process, the regulatory aspects, and the technical challenges of decommissioning commercial nuclear units.

Work Difficulty Factors

TLG has historically applied work difficulty adjustment factors (WDFs) to account for the inefficiencies in working in a power plant environment. WDFs

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9 T.S. LaGuardia et al., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986

10 W.J. Manion and T.S. LaGuardia, "Decommissioning Handbook," U.S. Department of Energy, DOE/EV/10128-1, November 1980

11 "Building Construction Cost Data 2005," Robert Snow Means Company, Inc., Kingston, Massachusetts

are assigned to each unique set of unit factors, commensurate with the working conditions. The ranges used for the WDFs were as follows:

| | |
|---|---|
| • Access Factor | 0% to 30% |
| • Respiratory Protection Factor | 0% to 50% |
| • Radiation/ALARA Factor | 0% to 100% |
| • Protective Clothing Factor | 0% to 50% |
| • Work Break Factor | 8.33% |

The factors and their associated range of values were originally developed in conjunction with the AIF/NESP-036 study.

Scheduling Program Durations

Activity durations are used to develop the total decommissioning program schedule. The unit cost factors, adjusted for WDFs as described above, are applied against the inventory of materials to be removed. The work area (or building area) is then evaluated for the most efficient number of workers/crews for the identified decommissioning activities. The adjusted unit cost factors are then compared against the available manpower so that an overall duration for removal of components and piping from each work area can be calculated.

The schedule is used to assign carrying costs, which include program management, administration, field engineering, equipment rental, and support services such as quality control and security.

## 1.5 IMPACT OF DECOMMISSIONING MULTIPLE REACTOR UNITS

In estimating the near simultaneous decommissioning of similar and regional reactor units there can be opportunities to achieve economies of scale, by sharing costs between units, and coordinating the sequence of work activities. The Entergy Northeast fleet currently consists of three Mark I design BWRs (Pilgrim, Vermont and FitzPatrick) with shutdown dates of 2012, 2012 and 2014, respectively.

The cost model assumes that Entergy will manage the decontamination and dismantling of Pilgrim, directly supervising the field crews. Specialty contractors would be engaged as needed to support the project or to provide project critical skills. As part of a fleet of reactors in the northeast, it was also assumed that Pilgrim would benefit from certain synergies (planning, engineering, contracting, and administration). As such, the program management labor costs (excluding security) were reduced 5% to reflect such anticipated savings.

## 1.6 FINANCIAL COMPONENTS OF THE COST MODEL

TLG's proprietary decommissioning cost model, DECCER, produces a number of distinct cost elements. These direct expenditures, however, do not comprise the total cost to accomplish the project goal (i.e., license termination and site restoration).

Inherent in any cost estimate that does not rely on historical data is the inability to specify the precise source of costs imposed by factors such as tool breakage, accidents, illnesses, weather delays, and labor stoppages. In the DECCER cost model, contingency fulfills this role. Contingency is added to each line item to account for costs that are difficult or impossible to develop analytically. Such costs are historically inevitable over the duration of a job of this magnitude; therefore, this cost analysis includes funds to cover these types of expenses.

### 1.6.1 Contingency

Consistent with standard cost estimating practices, contingencies were applied to the decontamination and dismantling costs developed as a "specific provision for unforeseeable elements of cost within the defined project scope, particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur."[12] The cost elements in the estimate were based on ideal conditions; therefore, the types of unforeseeable events that are almost certain to occur in decommissioning, based on industry experience, were addressed through a percentage contingency applied on a line-item basis. This contingency factor is a nearly universal element in all large-scale construction and demolition projects. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of decommissioning over the remaining operating life of the nuclear unit.

The contingency values are applied to the appropriate components of the estimates on a line item basis. A composite value is then reported at the end of the detailed estimate. The composite contingency value reported for the SAFSTOR scenario, and as shown in the detail table in Appendix A, was 17.34%.

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12 Project and Cost Engineers' Handbook, Second Edition, American Association of Cost Engineers, Marcel Dekker, Inc., New York, New York, p. 239.

### 1.6.2 Financial Risk

In addition to the routine uncertainties addressed by contingency, another cost element that is sometimes necessary to consider when bounding decommissioning costs relates to uncertainty, or risk. Examples can include changes in work scope, pricing, job performance, and other variations that could conceivably, but not necessarily, occur. Consideration is sometimes necessary to generate a level of confidence in the estimate, within a range of probabilities. TLG considers these types of costs under the broad term "financial risk." Included within the category of financial risk are:

- Transition activities and costs: ancillary expenses associated with eliminating 50% to 80% of the site labor force shortly after the cessation of plant operations, added cost for worker separation packages throughout the decommissioning program, national or company-mandated retraining, and retention incentives for key personnel.
- Delays in approval of the decommissioning plan due to intervention, legal challenges, and national and local hearings.
- Changes in the project work scope from the baseline estimate, involving the discovery of unexpected levels of contaminants, contamination in places not previously expected, contaminated soil previously undiscovered (either radioactive or hazardous material contamination), variations in plant inventory or configuration not indicated by the as-built drawings.
- Regulatory changes (e.g., affecting worker health and safety, site release criteria, waste transportation, and disposal).
- Policy decisions altering national commitments (e.g., in the ability to accommodate certain waste forms for disposition, or in the timetable for such: the start and rate of acceptance of spent fuel by the DOE).
- Pricing changes for basic inputs, such as labor, energy, materials, and burial.

It has been TLG's experience that the results of a risk analysis, when compared with the base case estimate for decommissioning, indicate that the chances of the base decommissioning estimate's being too high is a low probability, and the chances that the estimate is too low is a higher probability. This is mostly due to the pricing uncertainty for low-level radioactive waste burial, and to a lesser extent due to schedule increases from changes in plant conditions and to pricing variations in

the cost of labor (both craft and staff). This cost study, however, does not add any additional costs to the estimate for financial risk, since there is insufficient historical data from which to project future liabilities. Consequently, the areas of uncertainty or risk are revisited periodically and addressed through updates of the base estimate.

## 1.7 SITE-SPECIFIC CONSIDERATIONS

There are a number of site-specific considerations that affect the method for dismantling and removal of equipment from the site and the degree of restoration required. The cost impacts of the considerations identified below were included within the estimate.

### 1.7.1 Spent Fuel Disposition

Congress passed the "Nuclear Waste Policy Act"[13] (NWPA) in 1982, assigning the federal government's long-standing responsibility for disposal of the spent nuclear fuel created by the commercial nuclear generating plants to the DOE. The NWPA provided that DOE would enter into contracts with utilities in which DOE would promise to take the utilities' spent fuel and high-level radioactive waste and utilities would pay the cost of the disposition services for that material. NWPA, along with the individual contracts with the utilities, specified that the DOE was to begin accepting spent fuel by January 31, 1998.

Since the original legislation, the DOE has announced several delays in the program schedule. By January 1998, the DOE had failed to accept any spent fuel or high level waste, as required by the NWPA and utility contracts. Delays continue and, as a result, generators have initiated legal action against the DOE in an attempt to obtain compensation for DOE's breach of contract.

Operation of DOE's yet-to-be constructed repository is contingent upon the review and approval of the facility's license application by the NRC, the successful resolution of pending litigation, and the development of a national transportation system. The DOE submitted its license application to the NRC on June 3, 2008, seeking authorization to construct the repository at Yucca Mountain, Nevada. Assuming a timely review, DOE expects that receipt of fuel could begin as early as 2017,[14] depending upon the level of funding appropriated by Congress.

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13 "Nuclear Waste Policy Act of 1982 and Amendments," DOE's Office of Civilian Radioactive Management, 1982.

14 "DOE Announces Yucca Mountain License Application Schedule", U.S. Department of Energy's

It is generally necessary that spent fuel be actively cooled and stored for a minimum period at the generating site prior to transfer. The NRC requires that licensees establish a program to manage and provide funding for the management of all irradiated fuel at the reactor until title of the fuel is transferred to the DOE, pursuant to 10 CFR Part 50.54(bb).[15] This funding requirement is fulfilled through inclusion of certain cost elements in the decommissioning estimate, for example, costs associated with the isolation and continued operation of the spent fuel pool and construction and operation of an ISFSI.

At shutdown, the spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor core. Over a period of five and one-half years following shutdown, the assemblies are packaged into multipurpose canisters for transfer to the ISFSI. It is assumed that this period provides the necessary cooling for the final core to meet the design requirements for decay heat.

DOE's contracts with utilities generally order the acceptance of spent fuel from utilities based upon the oldest fuel receiving the highest priority. For purposes of this analysis, acceptance of commercial spent fuel by the DOE was expected to begin in 2017. The first assemblies removed from the Pilgrim site are assumed to be in 2019. With an estimated rate of transfer of 3,000 metric tons of uranium (MTU)/year, completion of the removal of fuel from the site is projected to be in the year 2042.

An ISFSI, which can be operated under the Station's general license, is assumed to be constructed to permit post-shutdown dry fuel storage. Once the pool is emptied, the spent fuel storage and handling facilities are placed into safe-storage.

Entergy Nuclear's position is that the DOE has a contractual obligation to accept Pilgrim fuel earlier than the projections set out above. No assumption made in the study should be interpreted to be inconsistent with this claim. However, at this time, including the cost of storing spent fuel in this study is the most reasonable approach because it insures the availability of sufficient decommissioning funds at the end of the station's life if, contrary to its contractual obligation, the DOE has not performed earlier.

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Office of Public Affairs, Press Release July 19, 2006

15 U.S. Code of Federal Regulations, Title 10, Part 50, "Domestic Licensing of Production and Utilization Facilities," Subpart 54 (bb), "Conditions of Licenses."

ISFSI

In the assumed scenario, 3,594 assemblies are generated through the end of currently licensed operations in 2012. An ISFSI is constructed within the owner controlled area to permit post-shutdown dry fuel storage. The assemblies stored in the reactor building's spent fuel storage pool at the time of shutdown are loaded into multi-purpose canisters (MPCs) and moved into storage casks on the new pad by late 2017. The MPCs are periodically off-loaded into a DOE transport cask such that all canisters are removed from the site by the year 2042. Entergy Nuclear's analysis assumes, for purposes only of this report, that Entergy Nuclear does not employ DOE spent fuel disposal contract allowances for up to 20% additional fuel designation for shipment to DOE each year.

The estimate includes the cost to build the ISFSI pad, transporter path, and security systems and support facilities. Once completed, Entergy anticipates loading 53 MPCs with the assemblies stored in the reactor building's spent fuel pool. The MPCs will then be placed in storage casks on the ISFSI.

In the absence of identifiable DOE transport cask requirements, the design and capacity of the new ISFSI is based upon a commercial dry cask storage system. It should be noted that Entergy's contract with the DOE requires DOE to provide transport canisters to Entergy, but for present purposes, this estimate includes this cost.

Storage Canister Design

The design and capacity of the ISFSI is based upon the Holtec HI-STORM dry cask storage system. The Holtec multi-purpose canister or MPC has a capacity of 68 fuel assemblies.

Canister Loading and Transfer

The estimate includes the costs to purchase, load, and transfer the MPCs from the pool to the ISFSI. Costs are also included for the transfer of the fuel at the ISFSI into a DOE transport cask.

Operations and Maintenance

The estimate includes costs for the operation of the spent fuel pool until it is emptied and the operation of the ISFSI until the spent fuel is transferred to the DOE.

The ISFSI operating duration is based upon the previously stated assumptions on fuel transfer schedule expectations.

ISFSI Design Considerations

A multi-purpose (storage and transport) dry shielded storage canister with a vertical, reinforced concrete storage silo is used as a basis for this cost analysis. Approximately 50% of the silos are assumed to have some level of neutron-induced activation as a result of the long-term storage of the fuel (i.e., to levels exceeding free-release limits). Approximately 10% of the concrete and steel is assumed to be removed from the overpacks for controlled disposal. The cost of the disposition of this material, as well as the demolition of the ISFSI facilities, is reflected within the estimate.

Greater-than-Class C (GTCC)

The dismantling of the reactor internals generates radioactive waste considered unsuitable for shallow land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the Federal Government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste. However, to date, the Federal Government has not identified a cost for disposing of GTCC or a schedule for acceptance. As such, the estimate to decommission Pilgrim included an allowance for the disposition of GTCC material.

For purposes of the study, GTCC was packaged in the same canisters used for spent fuel. The GTCC material is assumed to be shipped directly to a DOE facility as it is generated (since the fuel has been removed from the site prior to the start of decommissioning and the ISFSI deactivated).

### 1.7.2 Reactor Vessel and Internal Components

The reactor pressure vessel and reactor internal components were assumed to be segmented for disposal in shielded transportation casks. Segmentation and packaging of the internals would be performed in the dryer-separator pool where a turntable and remote cutter are installed. The vessel is segmented in place using a mast-mounted cutter supported off the lower head and directed from a shielded work platform installed overhead in the reactor well. Transportation cask specifications and Department of Transportation (DOT) regulations dictate segmentation and packaging methodology (i.e., packaging will meet the current physical and radiological limitations and regulations). Cask shipments are made in DOT-approved, currently available truck casks.

As stated previously, the dismantling of reactor internals at the Pilgrim reactor will generate radioactive waste considered unsuitable for shallow land disposal (i.e., GTCC). For purposes of this study, the GTCC radioactive waste was packaged and disposed of as high-level waste, at a cost equivalent to that envisioned for the spent fuel.

Intact disposal of the reactor vessel and internal components can provide savings in cost and worker exposure by eliminating the complex segmentation requirements, isolation of the GTCC material, and transport/storage of the resulting waste packages. Portland General Electric (PGE) was able to dispose of the Trojan reactor as an intact package. However, the location of the Trojan Nuclear Plant on the Columbia River simplified the transportation analysis.

It is not known whether this option will be available when Pilgrim ceases operation. Future viability of this option will depend upon the ultimate location of the disposal site, as well as the site licensee's ability to accept highly radioactive packages and effectively isolate them from the environment. Consequently, the study assumes the reactor vessel will be segmented, as a bounding condition.

### 1.7.3 Primary System Components

The current scenario defers decommissioning for approximately 30 years (until the spent fuel is removed from the site). The delay will result in lower working area dose rate (from natural decay of the radionuclides produced from plant operations). As such, decontamination of the reactor recirculation system components and associated reactor water

cleanup systems is not anticipated to be necessary and no allowance is included for this activity within the estimate.

Reactor recirculation piping is cut from the reactor vessel once the water level in the vessel (used for personnel shielding during dismantling and cutting operations in and around the vessel) drops below the nozzle zone. The piping is boxed and shipped by shielded van. The reactor recirculation pumps and motors are lifted out intact, packaged, and transported for processing or disposal.

1.7.4 Retired Components

This estimate assumes that any waste stored on site as a result of operations will be dispositioned as an operating expense. Therefore, the estimate did not include any costs for components that could be in storage at the site upon the cessation of plant operations.

1.7.5 Main Turbine and Condenser

The main turbine is dismantled using conventional maintenance procedures. Decontamination, if needed, will be limited due to the delay in the start of decommissioning and the resulting natural decay of the radionuclides produced from plant operations.

The turbine rotors and shafts are removed to a laydown area. The lower turbine casings are removed from their anchors by controlled demolition. The main condensers are also disassembled and moved to a laydown area. Material is then prepared for transportation to an off-site recycling facility where it will be surveyed and designated for either decontamination or volume reduction, conventional disposal, or controlled disposal. Components are packaged and readied for transport in accordance with the intended disposition.

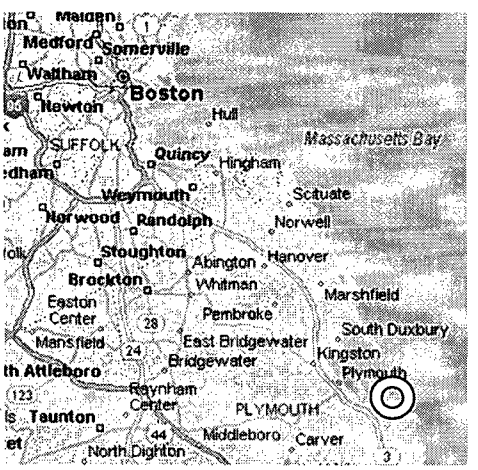
1.7.6 Transportation Methods

It is expected that most of the contaminated piping, components, and structural material, other than the highly activated reactor vessel and internal components, will qualify as LSA-I, II or III or Surface Contaminated Object, SCO-I or II, as described in Title 49.[16] The contaminated material is packaged in Industrial Packages (IP-1, IP-2, or

[16] U.S. Department of Transportation, Section 49 of the Code of Federal Regulations, "Transportation," Parts 173 through 178, 2006

IP-3, as defined in subpart 173.411) for transport unless demonstrated to qualify as their own shipping containers. The reactor vessel and internal components are expected to be transported in accordance with §71, as Type B. It is conceivable that the reactor may qualify as LSA II or III. However, the high radiation levels on the outer surface would require that additional shielding be incorporated within the packaging so as to attenuate the dose to levels acceptable for transport.

Any fuel cladding failure that occurred during the lifetime of the plant is assumed to have released fission products at sufficiently low levels that the buildup of long-lived isotopes (e.g., $^{137}Cs$, $^{90}Sr$, or transuranics) has not reached levels exceeding those that permit the major reactor components to be shipped under current transport regulations requirements.




Transport of the highly activated metal, produced in the segmentation of the reactor vessel and internal components, is by shielded truck cask. Cask shipments may exceed 95,000 pounds, including vessel segment(s), supplementary shielding, cask tie-downs, and tractor-trailer. The maximum level of activity per shipment assumed permissible is based upon the license limits of the available shielded transport casks. The segmentation scheme for the vessel and internal segments is designed to meet these limits.

For estimating purposes, costs to transport low-level radioactive waste were developed from published tariffs from Tri-State Motor Transit[17] with Energy-Solutions' facility in Clive, Utah as the destination. Memphis, Tennessee was used as the destination for off-site processing.

### 1.7.7 Low-Level Radioactive Waste Conditioning and Disposal

The contaminated and activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low-level (radioactive) waste, although not all of the material

[17] Tri-State Motor Transit Company, published tariffs, Interstate Commerce Commission (ICC), Docket No. MC-427719 Rules Tariff, March 2004, Radioactive Materials Tariff, February 2006.

is suitable for "shallow-land" disposal. With the passage of the "Low-Level Radioactive Waste Policy Act" in 1980,[18] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders.

The federal law encouraged the formation of regional groups or compacts to implement this objective safely, efficiently, and economically, and set a target date of 1986 for implementation. After little progress, the "Low-Level Radioactive Waste Policy Amendments Act of 1985,"[19] extended the implementation schedule, with specific milestones and stiff sanctions for non-compliance. Subsequent court rulings have substantially diluted those sanctions and, to date, no new compact facilities have been successfully sited, licensed and constructed.

At the time this analysis was prepared, Pilgrim was able to dispose of Class A, B or C low-level radioactive waste [20] at the licensed commercial low-level radioactive waste disposal facility in Barnwell, South Carolina. In June 2000, South Carolina formally joined with Connecticut and New Jersey to form the Atlantic Compact. Current South Carolina legislation requires South Carolina to gradually limit disposal capacity at the Barnwell facility through mid-2008. As of June 30, 2008, access to the Barnwell Low-Level Radioactive Waste Disposal Facility is available only to generators located in states affiliated with the Atlantic Compact. However, Pilgrim is still able to dispose of Class A material at EnergySolutions' facility in Clive, Utah.

The EnergySolutions' disposal facility was used as the destination for the majority of the waste volume generated by decommissioning (98%). EnergySolutions does not have a license to dispose of the more highly radioactive waste (Class B and C) generated in the dismantling of the reactor. As such, the disposal costs for this material (representing approximately 1.8% of the waste volume) were based upon Barnwell disposal rates as a proxy.

Material exceeding Class C limits (limited to material closest to the reactor core and comprising approximately 0.2% of the total waste volume) is generally not suitable for shallow-land disposal. This

18 "Low-Level Radioactive Waste Policy Act of 1980," Public Law 96-573, 1980
19 "Low-Level Radioactive Waste Policy Amendments Act of 1985," Public Law 99-240, 1986.
20 U.S. Code of Federal Regulations, Title 10, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste"

material is packaged in the same multipurpose canisters used for spent fuel storage/transport and designated for geologic disposal.[21]

A significant portion of the waste material generated during decommissioning may only be potentially contaminated by radioactive materials. This waste can be analyzed on site or shipped off site to licensed facilities for further analysis, for processing and/or for conditioning/ recovery. Reduction in the volume of low-level radioactive waste requiring disposal in a licensed low-level radioactive waste disposal facility can be accomplished through a variety of methods, including analyses and surveys or decontamination to eliminate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimate reflects the savings from waste recovery/volume reduction. Costs for waste processing/reduction were also based upon existing agreements.

Disposition of the low-level radioactive waste generated from decommissioning operations (and cost basis) is summarized in Table 1.

1.7.8 Site Conditions Following Decommissioning

The NRC will terminate (or amend) the site license if it determines that site remediation has been performed in accordance with the license termination plan, and that the terminal radiation survey and associated documentation demonstrate that the facility is suitable for release. The NRC's involvement in the decommissioning process ends at this point. Building codes and state environmental regulations dictate the next step in the decommissioning process, as well as the owner's own future plans and commitments for the site.

Only existing site structures were considered in the dismantling cost. The electrical switchyard was assumed to remain after Pilgrim was decommissioned in support of the regional transmission and distribution system. The intake and discharge canals were abandoned. The large underground tunnels between the cooling water intake and turbine building and discharge structure were assumed to be isolated, backfilled, and abandoned in place. Site utility and service piping were also abandoned. Electrical manholes were backfilled with suitable earthen material. Asphalt surfaces in the immediate vicinity of site buildings

21 Pursuant to the Low-Level Radioactive Waste Policy Act Amendments of 1985, Congress clarified that the Federal Government remains responsible for the disposal of Greater-Than-Class C waste.

were broken up and the material used for fill, as required. The site access road remained in place.

## 1.8 ASSUMPTIONS

The following assumptions were made in the development of the estimate for decommissioning the Pilgrim nuclear unit.

### 1.8.1 Estimating Basis

Decommissioning costs are reported in the year of projected expenditure; however, the values were provided in 2007 dollars. Costs were not inflated, escalated, or discounted over the periods of performance.

The estimate relied upon the physical plant inventory that was the basis for the 2002 analysis. There were no physical changes to the station since 2002 that would measurably impact decommissioning.

The study followed the principles of ALARA through the use of work duration adjustment factors. These factors address the impact of activities such as radiological protection instruction, mock-up training, and the use of respiratory protection and protective clothing. The factors lengthen a task's duration, increasing costs and lengthening the overall schedule. ALARA planning is considered in the costs for engineering and planning, and in the development of activity specifications and detailed procedures. Changes to worker exposure limits may impact the decommissioning cost and project schedule.

### 1.8.2 Site Contamination

Plant personnel reviewed the records of information important to the safe decommissioning of the facility (as maintained under 10 CFR 50.75(g)). The records did not indicate any areas of significant site contamination (specifically soil, groundwater and surface water) that needed to be addressed in the financial planning for decommissioning, at this time.

### 1.8.3 Release Criteria

The estimate assumed that the site would be remediated to the levels specified by the Nuclear Regulatory Commission for terminating the operating license. As such, levels of radioactivity would not exceed 25 mrem/yr total effective dose equivalent (TEDE) and would be as low as

reasonably achievable (ALARA).[22] Regulatory criteria established by the Massachusetts State Department of Public Health (10 mrem/yr) would also be met before the property would be transferred.

1.8.4 Labor Costs

Entergy was assumed to manage the decontamination and dismantling of the nuclear unit in addition to maintaining site security, radiological health and safety, quality assurance and overall site administration during the decommissioning. Entergy would provide the supervisory staff needed to oversee the labor subcontractors, consultants, and specialty contractors engaged to perform the field work associated with the decontamination and dismantling efforts.

Personnel costs were based upon average salary information made available by Entergy. Overhead costs were included for site and corporate support, reduced commensurate with the staffing levels envisioned for the project.

Severance and retention costs were not included in the estimate. Reduction in the operating organization is assumed to be handled through normal staffing processes (e.g., reassignment and outplacement).

The craft labor required to decontaminate and dismantle the nuclear unit is acquired through standard site contracting practices. The current cost of site labor is used as an estimating basis.

Security, while reduced from operating levels, was maintained throughout the decommissioning for access control, material control, and to safeguard the spent fuel.

1.8.5 Design Conditions

Activation levels in the vessel and internal components were modeled using NUREG/CR-3474.[23] Estimates are derived from the curie/gram values contained therein and adjusted for the different mass of the Pilgrim components, projected operating life(s), and different periods of

22 Code of Federal Regulations, Title 10, Section 20.1402, "Radiological Criteria for Unrestricted Use"

23 J.C. Evans et al., "Long-Lived Activation Products in Reactor Materials" NUREG/CR-3474, Pacific Northwest Laboratory for the Nuclear Regulatory Commission, August 1984

decay. Additional short-lived isotopes were derived from CR-0130[24] and CR-0672,[25] and benchmarked to the long-lived values from CR-3474.

The disposal cost for the control blades removed from the vessel with the final core load is included within the estimate. Disposition of any blades stored in the pools from operations were considered an operating expense and therefore not accounted for in the decommissioning estimate.

For purposes of the estimate, activation of the reactor building structures was assumed to be confined to the area around the sacrificial shield.

1.8.6 General

Transition Activities

Existing warehouses are assumed to be cleared of non-essential material and remain for use by Entergy and its subcontractors. The plant's operating staff performs the following activities during the transition period.

- Drain and collect fuel oils, lubricating oils, and transformer oils for recycle and/or sale.
- Drain and collect acids, caustics, and other chemical stores for recycle and/or sale.
- Process operating waste inventories. Disposal of operating wastes during this initial period is not considered a decommissioning expense.

Scrap and Salvage

The existing plant equipment is considered obsolete and suitable for scrap as deadweight quantities only. Entergy will make economically reasonable efforts to salvage equipment following final plant shutdown. However, dismantling techniques assumed by TLG for equipment in this analysis are not consistent with removal techniques required for salvage

[24] R.I. Smith, G.J. Konzek, W.E. Kennedy, Jr., "Technology, Safety and Costs of Decommissioning a Reference Pressurized Water Reactor Power Station," NUREG/CR-0130 and addenda, Pacific Northwest Laboratory for the Nuclear Regulatory Commission, June 1978

[25] H.D. Oak, et al., "Technology, Safety and Costs of Decommissioning a Reference Boiling Water Reactor Power Station," NUREG/CR-0672 and addenda, Pacific Northwest Laboratory for the Nuclear Regulatory Commission, June 1980

(resale) of equipment. Experience has indicated that buyers prefer equipment stripped down to very specific requirements before they would consider purchase. This can require expensive rework after the equipment had been removed from its installed location. Since placing salvage value on this machinery and equipment would be speculative, and the value would be small in comparison to the overall cost of decommissioning, this analysis does not attempt to quantify the value that an owner may realize based upon those efforts, and does not include any salvage credit.

It is assumed, for purposes of this analysis, that any value received from the sale of clean scrap generated in the dismantling process would be more than offset by the on-site processing costs. The dismantling techniques assumed in the decommissioning estimates do not include the additional cost for size reduction and preparation to meet "furnace ready" conditions. With a volatile market, the potential profit margin in scrap recovery is highly speculative, regardless of the ability to free release this material. Therefore clean scrap is disposed of at no cost or credit to the project.

Furniture, tools, mobile equipment such as forklifts, trucks, bulldozers, and other property is removed at no cost or credit to the decommissioning project. Disposition may include relocation to other facilities. Spare parts are made available for alternative use.

Spent Fuel Pool Isolation

The decommissioning cost estimate for Pilgrim assumes that the reactor building will be used for the interim storage of spent fuel once plant operations cease until the fuel can be relocated to the ISFSI (a minimum of five years based upon the heat load criteria of the dry storage system). Therefore, so that the adjacent power block structures can be de-energized and configured for long-term storage, the reactor building, and in particular the spent fuel storage area, will be isolated, creating a spent fuel island. This process can involve; establishing a local control area, installing in-situ pool cooling and water cleanup systems, establishing and routing independent power and control systems, redesigning the heating and ventilation systems, reconfiguring the area monitoring systems and relocating the security boundary. Costs for these activities are based upon experience at plants that have undergone decommissioning and, in the process, isolated their spent fuel pool operations.

Energy

For estimating purposes, the plant was assumed to be de-energized, with the exception of those facilities associated with spent fuel storage (temporary power is run throughout the plant, as needed). Replacement power costs are used to calculate the cost of energy consumed during decommissioning for tooling, lighting, ventilation, and essential services.

Insurance

Costs for continuing coverage (nuclear liability and property insurance) following cessation of plant operations and during decommissioning are included and based upon current operating premiums. Reductions in premiums, throughout the decommissioning process, are consistent with the guidance and the limits for coverage defined in the NRC's proposed rulemaking "Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors."[26] The NRC's financial protection requirements are based on various reactor (and spent fuel) configurations.

Property Tax

Property taxes or fees in lieu of taxes were not included within the estimate.

Site Modifications

The perimeter fence and in-plant security barriers are moved, as appropriate, to conform to the site security plan in force during the various stages of the project.

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26 "Financial Protection Requirements for Permanently Shutdown Nuclear Power Reactors," 10 CFR Parts 50 and 140, Federal Register Notice, Vol. 62, No. 210, October 30, 1997

# 2. RESULTS

The proposed decommissioning scenario, major cost contributors and schedule of annual expenditures are summarized in Figure 1 and Tables 2 and 3. The summaries are based upon the 2005 detailed cost estimate provided in Appendix A (escalated to 2007 dollars). The cost elements are assigned to one of three subcategories: NRC License Termination, Spent Fuel Management, and Site Restoration. The subcategory "NRC License Termination" is used to accumulate costs that are consistent with "decommissioning" as defined by the NRC in its financial assurance regulations (i.e., 10 CFR §50.75). In situations where the long-term management of spent fuel is not an issue, the cost reported for this subcategory is generally sufficient to terminate the unit's operating license.

The "Spent Fuel Management" subcategory contains costs associated with the construction of an ISFSI, the containerization and transfer of spent fuel to the ISFSI over the first 5½ years of pool operations, and the management of the ISFSI until such time that the transfer of all fuel from this facility to an off-site location (e.g., geologic repository) is complete. It does not include any spent fuel management expenses incurred prior to the cessation of plant operations.

"Site Restoration" is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are removed to a depth of three feet and backfilled to conform to the local grade.

It should be noted that the costs assigned to these subcategories are allocations. Delegation of costs is for the purposes of comparison (e.g., with NRC financial guidelines) or to permit specific financial treatment (e.g., ARO determinations). In reality, there can be considerable interaction between the activities in the three subcategories. For example, an owner may decide to remove non-contaminated structures early in the project to improve access to highly contaminated facilities or plant components. In these instances, the non-contaminated removal costs could be reassigned from Site Restoration to an NRC License Termination support activity. However, in general, the allocations represent a reasonable accounting of those costs that can be expected to be incurred for the specific subcomponents of the total estimated program cost, if executed as described.

For purposes of this study, GTCC is packaged in the same canisters used for spent fuel. The GTCC material is assumed to be shipped directly to a DOE facility as it is generated (since the fuel has been removed from the site prior to the start of decommissioning and the ISFSI deactivated). While designated for disposal at the

geologic repository along with the spent fuel, GTCC waste is still classified herein as low-level radioactive waste and, as such, included as a "License Termination" expense.

## 2.1 Escalation of the 2005 Costs to 2007 Dollars

For purposes of escalation, TLG allocates its costs for decommissioning into categories (similar to the NRC, except that the NRC's labor category is further subdivided into "labor" and "equipment and materials," and an "other" category added for miscellaneous fees, taxes and other unique or one-time expenditures).

The 2005 cash flows were escalated to year-end 2007 dollars using indices provided by Global Insight (Global Insight is a privately held company formed from the two leading economic and financial information companies, DRI (Data Resources, Inc.) and WEFA (Wharton Econometric Forecasting Associates)). The results are shown in Tables 3 through 6. The following table identifies the Global Insight forecast data sets used for the five cost categories.

| Global Insight Forecast Database | Total Escalation (%) (2005 to 2007) | TLG Cost Category |
|---|---|---|
| | | |
| ECI Total Compensation (ECIPCTNS) | 6.1 | Labor |
| Producer Price Index, Machinery & Equipment (WPIP11) | 2.9 | Equipment/Material |
| Producer Price Index, Fuels and Related Products and Power (WPIP05) | 13.6 | Energy |
| Consumer Price Index, Services (CUSASNS) | 7.3 | Other |
| Consumer Price Index, Services (CUSASNS) | 7.3 | Burial and Recycling |

## 2.2 Financial Assurance

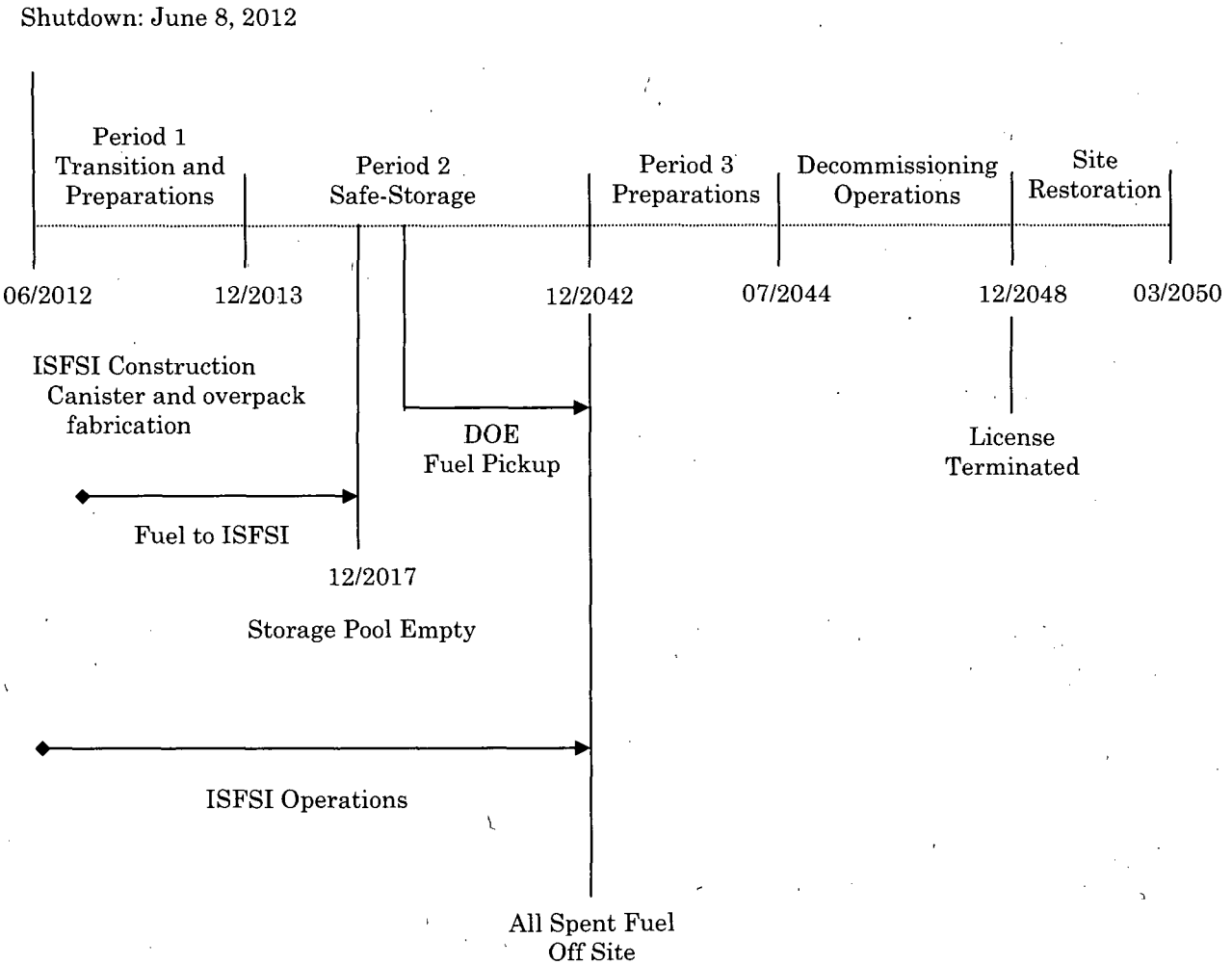
It is the current plan, based on the growth of the funds in the Pilgrim decommissioning trust, to fund the expenditures for license termination and spent fuel management from the currently existing decommissioning trust fund and from proceeds from spent fuel litigation against the DOE.

Table 7 combines the projected expenditures for license termination and spent fuel management (from Tables 4 and 5). As shown in Table 8, based on a 3%

annual inflation, the real rate of return required to fund the evaluated scenario, placing Pilgrim into safe-storage at the conclusion of its current licensed operating life in 2012 until the spent fuel could be removed from the site (estimated to be in the year 2042 based upon a 2017 startup of DOE's geologic repository) with subsequent decommissioning of the nuclear unit, is approximately 1.471%. This is less than the 2% real rate of return identified in 10 CFR 50.75. With these criteria, the scenario of funding both license termination and spent fuel management from the existing trust fund is financially viable.

Pursuant to 10 CFR 50.75(f)(4), the licensee states that it plans to review the adequacy of decommissioning funds on an annual basis throughout the decommissioning process. If costs have exceeded estimates, or if fund performance has not met the assumptions used in financial adequacy calculations, the licensee will either extend the period of SAFSTOR (not to exceed 10 CFR 50.82(a)(3) limits without Commission approval) to allow for more fund growth, or will supplement the fund (or otherwise directly pay decommissioning-related expenses) as necessary.

## FIGURE 1
## DECOMMISSIONING TIMELINE
(not to scale)



# TABLE 1
## Pilgrim Nuclear Power Station
## Low-Level Radioactive Waste Disposition

| Waste | Cost Basis | Class [1] | Waste Volume (cubic feet) | Mass (pounds) |
|---|---|---|---|---|
| | | | | |
| Low-Level Radioactive Waste (near-surface disposal) | EnergySolutions | A | 194,998 | 12,864,971 |
| | Barnwell | B | 3,313 | 402,190 |
| | Barnwell | C | 287 | 36,625 |
| | | | | |
| Greater than Class C (geologic repository) | Spent Fuel Equivalent | GTCC | 480 | 82,000 |
| | | | | |
| Processed/Conditioned (off-site recycling center) | Recycling Vendors | A | 408,531 | 17,934,830 |
| | | | | |
| Total [2] | | | 607,609 | 31,320,616 |

[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55
[2] Columns may not add due to rounding

# TABLE 2
## Pilgrim Nuclear Power Station
## Summary of Major Cost Contributors
(thousands, 2007 dollars)

| | License Termination | Spent Fuel Management | Site Restoration | Total |
|---|---|---|---|---|
| Decontamination | 20,831 | 0 | 0 | 20,831 |
| Removal | 76,730 | 2,783 | 17,969 | 97,482 |
| Waste Packaging | 10,069 | 12 | 0 | 10,081 |
| Transportation | 9,732 | 338 | 0 | 10,071 |
| Waste Disposal | 61,331 | 1,377 | 0 | 62,708 |
| Waste Conditioning (Off-Site) | 48,678 | 0 | 0 | 48,678 |
| Program Management [1] | 225,787 | 164,840 | 15,357 | 405,984 |
| Property Taxes | 0 | 0 | 0 | 0 |
| Insurance | 4,853 | 16,977 | 0 | 21,831 |
| Spent Fuel Management [2] | 0 | 125,401 | 0 | 125,401 |
| Regulatory Fees | 10,704 | 0 | 0 | 10,704 |
| Energy | 13,227 | 3,356 | 271 | 16,853 |
| Other | 67,858 | 13,615 | 2,322 | 83,796 |
| | | | | |
| Total | 549,800 | 328,701 | 35,918 | 914,419 |

[1] Includes security and engineering
[2] Includes capital costs for ISFSI construction, multi-purpose storage containers, packaging and handling (transfer pool to ISFSI or DOE and ISFSI to DOE)

**TABLE 3**
**Pilgrim Nuclear Power Station**
**Schedule of Annual Expenditures**
**Total Decommissioning Cost**
(thousands, 2007 dollars)

| Year | Labor | Equip & Materials | Energy | Burial | Other | Yearly Totals |
|---|---|---|---|---|---|---|
| 2012 | 22,596 | 474 | 1,226 | 20 | 11,007 | 35,323 |
| 2013 | 54,427 | 11,881 | 2,058 | 932 | 18,605 | 87,903 |
| 2014 | 11,340 | 2,936 | 433 | 35 | 21,619 | 36,361 |
| 2015 | 11,340 | 2,936 | 433 | 35 | 21,619 | 36,361 |
| 2016 | 11,371 | 2,944 | 434 | 35 | 21,678 | 36,461 |
| 2017 | 10,924 | 2,769 | 408 | 35 | 20,302 | 34,438 |
| 2018 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2019 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2020 | 5,036 | 401 | 65 | 35 | 1,594 | 7,130 |
| 2021 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2022 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2023 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2024 | 5,036 | 401 | 65 | 35 | 1,594 | 7,130 |
| 2025 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2026 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2027 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2028 | 5,036 | 401 | 65 | 35 | 1,594 | 7,130 |
| 2029 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2030 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2031 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2032 | 5,036 | 401 | 65 | 35 | 1,594 | 7,130 |
| 2033 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2034 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2035 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2036 | 5,036 | 401 | 65 | 35 | 1,594 | 7,130 |
| 2037 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2038 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2039 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2040 | 5,036 | 401 | 65 | 35 | 1,594 | 7,130 |
| 2041 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2042 | 5,103 | 402 | 71 | 35 | 1,596 | 7,206 |
| 2043 | 34,380 | 1,273 | 2,163 | 35 | 4,062 | 41,913 |

**TABLE 3** (continued)
**Pilgrim Nuclear Power Station**
**Schedule of Annual Expenditures**
**Total Decommissioning Cost**
(thousands, 2007 dollars)

| Year | Labor | Equip & Materials | Energy | Burial | Other | Yearly Totals |
|---|---|---|---|---|---|---|
| 2044 | 44,036 | 12,801 | 2,115 | 28,981 | 14,559 | 102,492 |
| 2045 | 44,818 | 9,903 | 1,734 | 28,859 | 11,723 | 97,036 |
| 2046 | 42,636 | 6,038 | 1,622 | 18,575 | 7,240 | 76,110 |
| 2047 | 42,636 | 6,038 | 1,622 | 18,575 | 7,240 | 76,110 |
| 2048 | 27,473 | 3,101 | 712 | 4,453 | 4,610 | 40,349 |
| 2049 | 18,798 | 7,469 | 216 | 0 | 2,503 | 28,987 |
| 2050 | 4,275 | 1,698 | 49 | 0 | 569 | 6,591 |
| | | | | | | |
| Total | 506,777 | 82,255 | 16,853 | 101,436 | 207,098 | 914,419 |

**TABLE 4**
**Pilgrim Nuclear Power Station**
**Schedule of Annual Expenditures**
**License Termination Allocation**
(thousands, 2007 dollars)

| Year | Labor | Equip & Materials | Energy | Burial | Other | Yearly Totals |
|---|---|---|---|---|---|---|
| 2012 | 22,596 | 474 | 1,226 | 20 | 3,804 | 28,119 |
| 2013 | 53,747 | 11,720 | 2,032 | 932 | 6,747 | 75,178 |
| 2014 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2015 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2016 | 57 | 270 | 0 | 35 | 295 | 657 |
| 2017 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2018 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2019 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2020 | 57 | 270 | 0 | 35 | 295 | 657 |
| 2021 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2022 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2023 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2024 | 57 | 270 | 0 | 35 | 295 | 657 |
| 2025 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2026 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2027 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2028 | 57 | 270 | 0 | 35 | 295 | 657 |
| 2029 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2030 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2031 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2032 | 57 | 270 | 0 | 35 | 295 | 657 |
| 2033 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2034 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2035 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2036 | 57 | 270 | 0 | 35 | 295 | 657 |
| 2037 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2038 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2039 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2040 | 57 | 270 | 0 | 35 | 295 | 657 |
| 2041 | 57 | 269 | 0 | 35 | 294 | 655 |
| 2042 | 150 | 272 | 6 | 35 | 304 | 767 |
| 2043 | 33,920 | 1,273 | 2,163 | 35 | 4,062 | 41,452 |

**TABLE 4** (continued)
**Pilgrim Nuclear Power Station**
**Schedule of Annual Expenditures**
**License Termination Cost**
(thousands, 2007 dollars)

| Year | Labor | Equip & Materials | Energy | Burial | Other | Yearly Totals |
|---|---|---|---|---|---|---|
| 2044 | 43,603 | 12,790 | 2,115 | 28,981 | 14,559 | 102,047 |
| 2045 | 43,929 | 9,694 | 1,734 | 28,517 | 11,639 | 95,513 |
| 2046 | 41,485 | 5,764 | 1,622 | 18,112 | 7,126 | 74,110 |
| 2047 | 41,485 | 5,764 | 1,622 | 18,112 | 7,126 | 74,110 |
| 2048 | 26,739 | 2,852 | 707 | 4,343 | 4,537 | 39,177 |
| 2049 | 144 | 0 | 0 | 0 | 654 | 798 |
| 2050 | 33 | 0 | 0 | 0 | 149 | 182 |
| | | | | | | |
| Total | 309,433 | 58,139 | 13,227 | 100,058 | 68,942 | 549,800 |

**TABLE 5**
**Pilgrim Nuclear Power Station**
**Schedule of Annual Expenditures**
**Spent Fuel Management Allocation**
(thousands, 2007 dollars)

| Year | Labor | Equip & Materials | Energy | Burial | Other | Yearly Totals |
|---|---|---|---|---|---|---|
| 2012 | 0 | 0 | 0 | 0 | 7,203 | 7,203 |
| 2013 | 680 | 161 | 26 | 0 | 11,858 | 12,725 |
| 2014 | 11,283 | 2,667 | 433 | 0 | 21,325 | 35,706 |
| 2015 | 11,283 | 2,667 | 433 | 0 | 21,325 | 35,706 |
| 2016 | 11,314 | 2,674 | 434 | 0 | 21,383 | 35,804 |
| 2017 | 10,867 | 2,500 | 408 | 0 | 20,008 | 33,783 |
| 2018 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2019 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2020 | 4,979 | 131 | 65 | 0 | 1,299 | 6,474 |
| 2021 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2022 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2023 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2024 | 4,979 | 131 | 65 | 0 | 1,299 | 6,474 |
| 2025 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2026 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2027 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2028 | 4,979 | 131 | 65 | 0 | 1,299 | 6,474 |
| 2029 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2030 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2031 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2032 | 4,979 | 131 | 65 | 0 | 1,299 | 6,474 |
| 2033 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2034 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2035 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2036 | 4,979 | 131 | 65 | 0 | 1,299 | 6,474 |
| 2037 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2038 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2039 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2040 | 4,979 | 131 | 65 | 0 | 1,299 | 6,474 |
| 2041 | 4,965 | 130 | 65 | 0 | 1,295 | 6,456 |
| 2042 | 4,952 | 130 | 65 | 0 | 1,292 | 6,438 |
| 2043 | 0 | 0 | 0 | 0 | 0 | 0 |

**TABLE 5** (continued)
**Pilgrim Nuclear Power Station**
**Schedule of Annual Expenditures**
**Spent Fuel Management Allocation**
(thousands, 2007 dollars)

| Year | Labor | Equip & Materials | Energy | Burial | Other | Yearly Totals |
|---|---|---|---|---|---|---|
| 2044 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2045 | 618 | 201 | 0 | 342 | 84 | 1,246 |
| 2046 | 836 | 272 | 0 | 462 | 114 | 1,684 |
| 2047 | 836 | 272 | 0 | 462 | 114 | 1,684 |
| 2048 | 204 | 85 | 0 | 110 | 27 | 426 |
| 2049 | 182 | 831 | 0 | 0 | 0 | 1,013 |
| 2050 | 41 | 189 | 0 | 0 | 0 | 230 |
| | | | | | | |
| Total | 172,346 | 15,782 | 3,356 | 1,377 | 135,841 | 328,701 |

**TABLE 6**
**Pilgrim Nuclear Power Station**
**Schedule of Annual Expenditures**
**Site Restoration Allocation**
(thousands, 2007 dollars)

| Year | Labor | Equip & Materials | Energy | Burial | Other | Yearly Totals |
|---|---|---|---|---|---|---|
| 2012 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2013 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2014 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2015 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2016 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2017 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2018 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2019 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2020 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2021 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2022 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2023 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2024 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2025 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2026 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2027 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2028 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2029 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2030 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2031 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2032 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2033 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2034 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2035 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2036 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2037 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2038 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2039 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2040 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2041 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2042 | 1 | 0 | 0 | 0 | 0 | 1 |
| 2043 | 460 | 0 | 0 | 0 | 0 | 460 |

**TABLE 6** (continued)
**Pilgrim Nuclear Power Station**
**Schedule of Annual Expenditures**
**Site Restoration Allocation**
(thousands, 2007 dollars)

| Year | Labor | Equip & Materials | Energy | Burial | Other | Yearly Totals |
|---|---|---|---|---|---|---|
| 2044 | 433 | 12 | 0 | 0 | 0 | 445 |
| 2045 | 271 | 7 | 0 | 0 | 0 | 278 |
| 2046 | 315 | 2 | 0 | 0 | 0 | 317 |
| 2047 | 315 | 2 | 0 | 0 | 0 | 317 |
| 2048 | 531 | 164 | 5 | 0 | 46 | 746 |
| 2049 | 18,472 | 6,638 | 216 | 0 | 1,849 | 27,175 |
| 2050 | 4,200 | 1,509 | 49 | 0 | 421 | 6,180 |
| | | | | | | |
| Total | 24,998 | 8,334 | 271 | 0 | 2,315 | 35,918 |

**TABLE 7**
**Pilgrim Nuclear Power Station**
**Schedule of Annual Expenditures**
**License Termination and Spent Fuel Management Allocations**
**(from Tables 4 and 5)**
(thousands, 2007 dollars)

| Year | Labor | Equip & Materials | Energy | Burial | Other | Yearly Totals |
|---|---|---|---|---|---|---|
| 2012 | 22,596 | 474 | 1,226 | 20 | 11,007 | 35,323 |
| 2013 | 54,427 | 11,881 | 2,058 | 932 | 18,605 | 87,903 |
| 2014 | 11,340 | 2,936 | 433 | 35 | 21,619 | 36,361 |
| 2015 | 11,340 | 2,936 | 433 | 35 | 21,619 | 36,361 |
| 2016 | 11,371 | 2,944 | 434 | 35 | 21,678 | 36,461 |
| 2017 | 10,924 | 2,769 | 408 | 35 | 20,302 | 34,438 |
| 2018 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2019 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2020 | 5,036 | 401 | 65 | 35 | 1,594 | 7,130 |
| 2021 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2022 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2023 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2024 | 5,036 | 401 | 65 | 35 | 1,594 | 7,130 |
| 2025 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2026 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2027 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2028 | 5,036 | 401 | 65 | 35 | 1,594 | 7,130 |
| 2029 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2030 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2031 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2032 | 5,036 | 401 | 65 | 35 | 1,594 | 7,130 |
| 2033 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2034 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2035 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2036 | 5,036 | 401 | 65 | 35 | 1,594 | 7,130 |
| 2037 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2038 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2039 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2040 | 5,036 | 401 | 65 | 35 | 1,594 | 7,130 |
| 2041 | 5,023 | 399 | 65 | 35 | 1,589 | 7,111 |
| 2042 | 5,102 | 402 | 71 | 35 | 1,596 | 7,205 |
| 2043 | 33,920 | 1,273 | 2,163 | 35 | 4,062 | 41,452 |

**TABLE 7** (continued)
**Pilgrim Nuclear Power Station**
**Schedule of Annual Expenditures**
**License Termination and Spent Fuel Management Allocations**
**(from Tables 4 and 5)**
(thousands, 2007 dollars)

| Year | Labor | Equip & Materials | Energy | Burial | Other | Yearly Totals |
|---|---|---|---|---|---|---|
| 2044 | 43,603 | 12,790 | 2,115 | 28,981 | 14,559 | 102,047 |
| 2045 | 44,547 | 9,895 | 1,734 | 28,859 | 11,723 | 96,758 |
| 2046 | 42,321 | 6,036 | 1,622 | 18,575 | 7,240 | 75,794 |
| 2047 | 42,321 | 6,036 | 1,622 | 18,575 | 7,240 | 75,794 |
| 2048 | 26,943 | 2,937 | 707 | 4,453 | 4,564 | 39,604 |
| 2049 | 327 | 831 | 0 | 0 | 654 | 1,812 |
| 2050 | 74 | 189 | 0 | 0 | 149 | 412 |
| | | | | | | |
| Total | 481,779 | 73,921 | 16,583 | 101,436 | 204,783 | 878,501 |

## TABLE 8
## Pilgrim Nuclear Power Station
## Funding Requirements to Equal Expected Expenditures
(millions, dollars)

| | | | | |
|---|---|---|---|---|
| Basis Year | 2007 | | | |
| Fund Balance | $621.74 | (millions) | | |
| Annual Escalation | 3.00% | | | |
| Annual Earnings | 4.471% | | | |
| | | License Termination and Spent Fuel Costs | | |
| Year | Projected Fund Balance (2007 $'s) | (2007 $'s) | (Nominal $) | (2007 Present Value $) |
| 2007 | 621.74 | - | - | - |
| 2008 | 649.54 | - | - | - |
| 2009 | 678.58 | - | - | - |
| 2010 | 708.92 | - | - | - |
| 2011 | 740.62 | - | - | - |
| 2012 | 732.79 | 35.32 | 40.95 | 32.91 |
| 2013 | 660.59 | 87.90 | 104.96 | 80.73 |
| 2014 | 645.41 | 36.36 | 44.72 | 32.92 |
| 2015 | 628.21 | 36.36 | 46.06 | 32.46 |
| 2016 | 608.72 | 36.46 | 47.57 | 32.09 |
| 2017 | 589.66 | 34.44 | 46.28 | 29.88 |
| 2018 | 606.18 | 7.11 | 9.84 | 6.08 |
| 2019 | 623.15 | 7.11 | 10.14 | 6.00 |
| 2020 | 640.54 | 7.13 | 10.47 | 5.93 |
| 2021 | 658.42 | 7.11 | 10.76 | 5.83 |
| 2022 | 676.78 | 7.11 | 11.08 | 5.75 |
| 2023 | 695.63 | 7.11 | 11.41 | 5.67 |
| 2024 | 714.95 | 7.13 | 11.79 | 5.60 |
| 2025 | 734.81 | 7.11 | 12.11 | 5.51 |
| 2026 | 755.20 | 7.11 | 12.47 | 5.43 |
| 2027 | 776.12 | 7.11 | 12.84 | 5.36 |
| 2028 | 797.56 | 7.13 | 13.26 | 5.29 |
| 2029 | 819.60 | 7.11 | 13.63 | 5.21 |
| 2030 | 842.21 | 7.11 | 14.03 | 5.13 |
| 2031 | 865.41 | 7.11 | 14.46 | 5.06 |
| 2032 | 889.18 | 7.13 | 14.93 | 5.00 |
| 2033 | 913.60 | 7.11 | 15.34 | 4.92 |
| 2034 | 938.65 | 7.11 | 15.80 | 4.85 |
| 2035 | 964.35 | 7.11 | 16.27 | 4.78 |
| 2036 | 990.67 | 7.13 | 16.80 | 4.73 |

**TABLE 8** (continued)
**Pilgrim Nuclear Power Station**
**Funding Requirements to Equal Expected Expenditures**
(millions, dollars)

| Basis Year | 2007 | | | |
|---|---|---|---|---|
| Fund Balance | $621.74 | (millions) | | |
| Annual Escalation | 3.00% | | | |
| Annual Earnings | 4.471% | | | |
| | | License Termination and Spent Fuel Costs | | |
| Year | Projected Fund Balance (2007 $'s) | (2007 $'s) | (Nominal $) | (2007 Present Value $) |
| 2037 | 1,017.70 | 7.11 | 17.26 | 4.65 |
| 2038 | 1,045.43 | 7.11 | 17.78 | 4.58 |
| 2039 | 1,073.86 | 7.11 | 18.31 | 4.52 |
| 2040 | 1,102.96 | 7.13 | 18.91 | 4.47 |
| 2041 | 1,132.85 | 7.11 | 19.43 | 4.39 |
| 2042 | 1,163.23 | 7.21 | 20.27 | 4.39 |
| 2043 | 1,095.10 | 41.45 | 120.14 | 24.88 |
| 2044 | 839.44 | 102.05 | 304.63 | 60.38 |
| 2045 | 579.46 | 96.76 | 297.51 | 56.45 |
| 2046 | 365.33 | 75.79 | 240.04 | 43.59 |
| 2047 | 134.42 | 75.79 | 247.24 | 42.98 |
| 2048 | 7.36 | 39.60 | 133.07 | 22.14 |
| 2049 | 1.42 | 1.81 | 6.27 | 1.00 |
| 2050 | 0.02 | 0.41 | 1.47 | 0.22 |
| | | 878.50 | | 621.74 |

# APPENDIX A

# 2005 DETAILED COST ANALYSIS

# Table A
## Pilgrim Nuclear Power Station
## SAFSTOR Decommissioning Cost Estimate
(thousands of 2005 dollars)

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes: Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PERIOD 1a - Shutdown through Transition** | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | SAFSTOR site characterization survey | - | - | - | - | - | - | 374 | 112 | 487 | 487 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.2 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 124 | 19 | 142 | 142 | - | - | - | - | - | - | - | - | - | 1,235 |
| 1a.1.3 | Notification of Cessation of Operations | | | | | | | | | a | | | | | | | | | | | |
| 1a.1.4 | Remove fuel & source material | | | | | | | | | n/a | | | | | | | | | | | |
| 1a.1.5 | Notification of Permanent Defueling | | | | | | | | | a | | | | | | | | | | | |
| 1a.1.6 | Deactivate plant systems & process waste | | | | | | | | | a | | | | | | | | | | | |
| 1a.1.7 | Prepare and submit PSDAR | - | - | - | - | - | - | 190 | 29 | 219 | 219 | - | - | - | - | - | - | - | - | - | 1,900 |
| 1a.1.8 | Review plant dwgs & specs. | - | - | - | - | - | - | 124 | 19 | 142 | 142 | - | - | - | - | - | - | - | - | - | 1,235 |
| 1a.1.9 | Perform detailed rad survey | | | | | | | | | a | | | | | | | | | | | |
| 1a.1.10 | Estimate by-product inventory | - | - | - | - | - | - | 95 | 14 | 109 | 109 | - | - | - | - | - | - | - | - | - | 950 |
| 1a.1.11 | End product description | - | - | - | - | - | - | 95 | 14 | 109 | 109 | - | - | - | - | - | - | - | - | - | 950 |
| 1a.1.12 | Detailed by-product inventory | - | - | - | - | - | - | 143 | 21 | 164 | 164 | - | - | - | - | - | - | - | - | - | 1,425 |
| 1a.1.13 | Define major work sequence | - | - | - | - | - | - | 95 | 14 | 109 | 109 | - | - | - | - | - | - | - | - | - | 950 |
| 1a.1.14 | Perform SER and EA | - | - | - | - | - | - | 295 | 44 | 339 | 339 | - | - | - | - | - | - | - | - | - | 2,945 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 475 | 71 | 546 | 546 | - | - | - | - | - | - | - | - | - | 4,750 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.16.1 | Prepare plant and facilities for SAFSTOR | - | - | - | - | - | - | 467 | 70 | 538 | 538 | - | - | - | - | - | - | - | - | - | 4,674 |
| 1a.1.16.2 | Plant systems | - | - | - | - | - | - | 396 | 59 | 455 | 455 | - | - | - | - | - | - | - | - | - | 3,958 |
| 1a.1.16.3 | Plant structures and buildings | - | - | - | - | - | - | 296 | 44 | 341 | 341 | - | - | - | - | - | - | - | - | - | 2,964 |
| 1a.1.16.4 | Waste management | - | - | - | - | - | - | 190 | 29 | 219 | 219 | - | - | - | - | - | - | - | - | - | 1,900 |
| 1a.1.16.5 | Facility and site dormancy | - | - | - | - | - | - | 190 | 29 | 219 | 219 | - | - | - | - | - | - | - | - | - | 1,900 |
| 1a.1.16 | Total | - | - | - | - | - | - | 1,540 | 231 | 1,771 | 1,771 | - | - | - | - | - | - | - | - | - | 15,396 |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant systems | - | - | - | - | - | - | 112 | 17 | 129 | 129 | - | - | - | - | - | - | - | - | - | 1,124 |
| 1a.1.17.2 | Facility closeout & dormancy | - | - | - | - | - | - | 114 | 17 | 131 | 131 | - | - | - | - | - | - | - | - | - | 1,140 |
| 1a.1.17 | Total | - | - | - | - | - | - | 226 | 34 | 260 | 260 | - | - | - | - | - | - | - | - | - | 2,264 |
| 1a.1.18 | Procure vacuum drying system | - | - | - | - | - | - | 10 | 1 | 11 | 11 | - | - | - | - | - | - | - | - | - | 95 |
| 1a.1.19 | Drain/de-energize non-cont. systems | | | | | | | | | a | | | | | | | | | | | |
| 1a.1.20 | Drain & dry NSSS | | | | | | | | | a | | | | | | | | | | | |
| 1a.1.21 | Drain/de-energize contaminated systems | | | | | | | | | a | | | | | | | | | | | |
| 1a.1.22 | Decon/secure contaminated systems | | | | | | | | | a | | | | | | | | | | | |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 3,784 | 624 | 4,408 | 4,408 | - | - | - | - | - | - | - | - | - | 34,095 |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | ISFSI Capital Expenditures | - | - | - | - | - | - | 7,217 | 1,083 | 8,299 | - | 8,299 | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 7,217 | 1,083 | 8,299 | - | 8,299 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 869 | 87 | 956 | 956 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 257 | - | - | - | - | - | 64 | 321 | 321 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 336 | - | - | - | - | - | 50 | 386 | 386 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 6 | 5 | - | 26 | - | 8 | 45 | 45 | - | - | 404 | - | - | - | 8,103 | 99 | - | - |
| 1a.4.6 | *Plant energy budget* | - | - | - | - | - | - | 1,655 | 248 | 1,904 | 1,904 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 265 | 27 | 292 | 292 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 2,089 | 209 | 2,297 | - | 2,297 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Site O&M | - | - | - | - | - | - | 2,847 | 427 | 3,275 | 3,275 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 978 | 147 | 1,125 | - | 1,125 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 103 | 15 | 118 | - | 118 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | *Corporate Overhead* | - | - | - | - | - | - | 1,499 | 225 | 1,724 | 1,724 | - | - | - | - | - | - | - | - | - | - |

# Table A
## Pilgrim Nuclear Power Station
## SAFSTOR Decommissioning Cost Estimate
### (thousands of 2005 dollars)

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period 1a Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 5,621 | 843 | 6,464 | 6,464 | - | - | - | - | - | - | - | - | - | 156,429 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 23,276 | 3,491 | 26,767 | 26,767 | - | - | - | - | - | - | - | - | - | 435,914 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 593 | 6 | 5 | - | 26 | 39,202 | 5,842 | 45,674 | 42,134 | 3,540 | - | - | 404 | - | - | - | 8,103 | 99 | 592,343 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 593 | 6 | 5 | - | 26 | 50,203 | 7,548 | 58,382 | 46,542 | 11,840 | - | - | 404 | - | - | - | 8,103 | 99 | 626,438 |
| **PERIOD 1b - SAFSTOR Limited DECON Activities** | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Reactor | 4,057 | - | - | - | - | - | - | 2,029 | 6,086 | 6,086 | - | - | - | - | - | - | - | - | 80,991 | - |
| 1b.1.1.2 | AOG Rentention | 44 | - | - | - | - | - | - | 22 | 66 | 66 | - | - | - | - | - | - | - | - | 945 | - |
| 1b.1.1.3 | Condenser Retube | 57 | - | - | - | - | - | - | 28 | 85 | 85 | - | - | - | - | - | - | - | - | 1,236 | - |
| 1b.1.1.4 | Main Stack & Filter | 12 | - | - | - | - | - | - | 6 | 18 | 18 | - | - | - | - | - | - | - | - | 268 | - |
| 1b.1.1.5 | Radwaste | 168 | - | - | - | - | - | - | 84 | 253 | 253 | - | - | - | - | - | - | - | - | 3,655 | - |
| 1b.1.1.6 | Turbine | 428 | - | - | - | - | - | - | 214 | 642 | 642 | - | - | - | - | - | - | - | - | 9,310 | - |
| 1b.1.1.7 | Spent Fuel Pool Area | 226 | - | - | - | - | - | - | 113 | 339 | 339 | - | - | - | - | - | - | - | - | 4,471 | - |
| 1b.1.1 | Totals | 4,993 | - | - | - | - | - | - | 2,496 | 7,489 | 7,489 | - | - | - | - | - | - | - | - | 100,875 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 4,993 | - | - | - | - | - | - | 2,496 | 7,489 | 7,489 | - | - | - | - | - | - | - | - | 100,875 | - |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 731 | - | - | - | - | - | - | 110 | 841 | 841 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | Process liquid waste | 98 | - | 37 | 36 | - | 248 | - | 120 | 539 | 539 | - | - | - | - | 675 | - | - | 85,100 | 133 | - |
| 1b.3.3 | Small tool allowance | - | 86 | - | - | - | - | - | 13 | 99 | 99 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.4 | ISFSI Capital Expenditures | - | - | - | - | - | - | 1,269 | 190 | 1,460 | - | 1,460 | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 830 | 86 | 37 | 36 | - | 248 | 1,269 | 433 | 2,939 | 1,479 | 1,460 | - | - | - | 675 | - | - | 85,100 | 133 | - |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 865 | - | - | - | - | - | - | 216 | 1,081 | 1,081 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 219 | 22 | 241 | 241 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 421 | - | - | - | - | - | 105 | 526 | 526 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 85 | - | - | - | - | - | 13 | 97 | 97 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 8 | 7 | - | 33 | - | 10 | 57 | 57 | - | - | - | 514 | - | - | - | 10,292 | 126 | - |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 417 | 63 | 480 | 480 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | *NRC Fees* | - | - | - | - | - | - | 67 | 7 | 74 | 74 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 526 | 53 | 579 | - | 579 | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Site O&M | - | - | - | - | - | - | 718 | 108 | 825 | 825 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 246 | 37 | 283 | - | 283 | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 26 | 4 | 30 | - | 30 | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Corporate Overhead | - | - | - | - | - | - | 378 | 57 | 434 | 434 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | *Security Staff Cost* | - | - | - | - | - | - | 1,417 | 213 | 1,629 | 1,629 | - | - | - | - | - | - | - | - | - | 39,429 |
| 1b.4.15 | Utility Staff Cost | - | - | - | - | - | - | 5,867 | 880 | 6,747 | 6,747 | - | - | - | - | - | - | - | - | - | 109,874 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 865 | 505 | 8 | 7 | - | 33 | 9,881 | 1,786 | 13,084 | 12,192 | 892 | - | - | 514 | - | - | - | 10,292 | 126 | 149,303 |
| 1b.0 | TOTAL PERIOD 1b COST | 6,688 | 591 | 45 | 42 | - | 281 | 11,151 | 4,715 | 23,512 | 21,160 | 2,352 | - | - | 514 | 675 | - | - | 95,392 | 101,134 | 149,303 |
| ***PERIOD 1c - Preparations for SAFSTOR Dormancy*** | | | | | | | | | | | | | | | | | | | | | |
| Period 1c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1c.1.1 | Prepare support equipment for storage | - | 404 | - | - | - | - | - | 61 | 465 | 465 | - | - | - | - | - | - | - | - | 3,000 | - |
| 1c.1.2 | Install containment pressure equal. lines | - | 35 | - | - | - | - | - | 5 | 41 | 41 | - | - | - | - | - | - | - | - | 700 | - |
| 1c.1.3 | Interim survey prior to dormancy | - | - | - | - | - | - | 733 | 220 | 953 | 953 | - | - | - | - | - | - | - | - | 14,369 | - |

# Table A
## Pilgrim Nuclear Power Station
## SAFSTOR Decommissioning Cost Estimate
### (thousands of 2005 dollars)

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes Class A Cu. Feet | Burial Volumes Class B Cu. Feet | Burial Volumes Class C Cu. Feet | Burial Volumes GTCC Cu. Feet | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1c.1.4 | *Secure building accesses* | | | | | | | | | a | | | | | | | | | | | |
| 1c.1.5 | Prepare & submit interim report | - | - | - | - | - | - | 55 | 8 | 64 | 64 | - | - | - | - | - | - | - | - | - | 554 |
| 1c.1 | Subtotal Period 1c Activity Costs | - | 439 | - | - | - | - | 788 | 294 | 1,522 | 1,522 | - | - | - | - | - | - | - | - | 18,069 | 554 |
| Period 1c Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1c.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 8,609 | 1,291 | 9,900 | 9,900 | - | - | - | - | - | - | - | - | - | - |
| 1c.2.2 | Site Characterization Survey | - | - | - | - | - | - | 1,801 | 540 | 2,341 | 2,341 | - | - | - | - | - | - | - | - | - | - |
| 1c.2.3 | Asbestos Remediation | - | 3,050 | 39 | 276 | - | 122 | - | 838 | 4,325 | 4,325 | - | - | - | 27,995 | - | - | - | 42,600 | 49,870 | - |
| 1c.2 | Subtotal Period 1c Additional Costs | - | 3,050 | 39 | 276 | - | 122 | 10,410 | 2,670 | 16,567 | 16,567 | - | - | - | 27,995 | - | - | - | 42,600 | 49,870 | - |
| Period 1c Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1c.3.1 | Process liquid waste | 108 | - | 41 | 40 | - | 273 | - | 132 | 593 | 593 | - | - | - | - | 743 | - | - | 93,678 | 146 | - |
| 1c.3.2 | Small tool allowance | - | 42 | - | - | - | - | - | 6 | 49 | 49 | - | - | - | - | - | - | - | - | - | - |
| 1c.3.3 | ISFSI Capital Expenditures | - | - | - | - | - | - | 1,283 | 192 | 1,476 | - | 1,476 | - | - | - | - | - | - | - | - | - |
| 1c.3 | Subtotal Period 1c Collateral Costs | 108 | 42 | 41 | 40 | - | 273 | 1,283 | 331 | 2,117 | 641 | 1,476 | - | - | - | 743 | - | - | 93,678 | 146 | - |
| Period 1c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1c.4.1 | Insurance | - | - | - | - | - | - | 221 | 22 | 244 | 244 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.2 | Property taxes | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.3 | Health physics supplies | - | 305 | - | - | - | - | - | 76 | 382 | 382 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.4 | Heavy equipment rental | - | 86 | - | - | - | - | - | 13 | 98 | 98 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.5 | Disposal of DAW generated | - | - | 2 | 1 | - | 7 | - | 2 | 11 | 11 | - | - | - | 103 | - | - | - | 2,065 | 25 | - |
| 1c.4.6 | Plant energy budget | - | - | - | - | - | - | 422 | 63 | 485 | 485 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.7 | NRC Fees | - | - | - | - | - | - | 68 | 7 | 74 | 74 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 532 | 53 | 585 | - | 585 | - | - | - | - | - | - | - | - | - |
| 1c.4.9 | Site O&M | - | - | - | - | - | - | 715 | 107 | 822 | 822 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 249 | 37 | 287 | - | 287 | - | - | - | - | - | - | - | - | - |
| 1c.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 26 | 4 | 30 | - | 30 | - | - | - | - | - | - | - | - | - |
| 1c.4.12 | Corporate Overhead | - | - | - | - | - | - | 382 | 57 | 439 | 439 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.13 | Security Staff Cost | - | - | - | - | - | - | 1,432 | 215 | 1,647 | 1,647 | - | - | - | - | - | - | - | - | - | 39,857 |
| 1c.4.14 | Utility Staff Cost | - | - | - | - | - | - | 5,827 | 874 | 6,701 | 6,701 | - | - | - | - | - | - | - | - | - | 109,474 |
| 1c.4 | Subtotal Period 1c Period-Dependent Costs | - | 391 | 2 | 1 | - | 7 | 9,875 | 1,531 | 11,807 | 10,904 | 902 | - | - | 103 | - | - | - | 2,065 | 25 | 149,331 |
| 1c.0 | TOTAL PERIOD 1c COST | 108 | 3,922 | 82 | 316 | - | 401 | 22,356 | 4,826 | 32,012 | 29,634 | 2,378 | - | - | 28,098 | 743 | - | - | 138,342 | 68,110 | 149,886 |
| **PERIOD 1 TOTALS** | | 6,795 | 5,107 | 133 | 364 | - | 708 | 83,710 | 17,089 | 113,906 | 97,337 | 16,570 | - | - | 29,016 | 1,418 | - | - | 241,837 | 169,344 | 925,627 |
| **PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage** | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1 | Quarterly Inspection | | | | | | | | | a | | | | | | | | | | | |
| 2a.1.2 | Semi-annual environmental survey | | | | | | | | | a | | | | | | | | | | | |
| 2a.1.3 | Prepare reports | | | | | | | | | a | | | | | | | | | | | |
| 2a.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 284 | 43 | 326 | 326 | - | - | - | - | - | - | - | - | - | - |
| 2a.1.5 | Maintenance supplies | - | - | - | - | - | - | 502 | 126 | 628 | 628 | - | - | - | - | - | - | - | - | - | - |
| 2a.1 | Subtotal Period 2a Activity Costs | - | - | - | - | - | - | 786 | 168 | 954 | 954 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 12,008 | 1,801 | 13,810 | - | 13,810 | - | - | - | - | - | - | - | - | - |
| 2a.3.2 | ISFSI Capital Expenditures | - | - | - | - | - | - | 53,042 | 7,956 | 60,999 | - | 60,999 | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | - | - | - | - | - | - | 65,051 | 9,758 | 74,808 | - | 74,808 | - | - | - | - | - | - | - | - | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Insurance | - | - | - | - | - | - | 2,010 | 201 | 2,212 | - | 2,212 | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Property taxes | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Health physics supplies | - | 257 | - | - | - | - | - | 64 | 321 | 321 | - | - | - | - | - | - | - | - | - | - |

# Table A
## Pilgrim Nuclear Power Station
## SAFSTOR Decommissioning Cost Estimate
(thousands of 2005 dollars)

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes: Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period 2a Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.4 | Disposal of DAW generated | - | - | 25 | 20 | - | 103 | - | 31 | 180 | 180 | - | - | - | 1,616 | - | - | - | 32,390 | 397 | - |
| 2a.4.5 | Plant energy budget | - | - | - | - | - | - | 1,323 | 198 | 1,522 | - | 1,522 | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | NRC Fees | - | - | - | - | - | - | 936 | 94 | 1,029 | 1,029 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 8,349 | 835 | 9,183 | - | 9,183 | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | Site O&M | - | - | - | - | - | - | 1,223 | 183 | 1,406 | - | 1,406 | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Spent Fuel Pool O&M | - | - | - | - | - | - | 3,909 | 586 | 4,495 | - | 4,495 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 411 | 62 | 473 | - | 473 | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Corporate Overhead | - | - | - | - | - | - | 599 | 90 | 689 | - | 689 | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | Security Staff Cost | - | - | - | - | - | - | 14,979 | 2,247 | 17,226 | - | 17,226 | - | - | - | - | - | - | - | - | 416,857 |
| 2a.4.13 | Utility Staff Cost | - | - | - | - | - | - | 18,971 | 2,846 | 21,817 | - | 21,817 | - | - | - | - | - | - | - | - | 350,160 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | - | 257 | 25 | 20 | - | 103 | 52,711 | 7,438 | 60,554 | 1,530 | 59,023 | - | - | 1,616 | - | - | - | 32,390 | 397 | 767,017 |
| 2a.0 | TOTAL PERIOD 2a COST | - | 257 | 25 | 20 | - | 103 | 118,548 | 17,363 | 136,316 | 2,485 | 133,832 | - | - | 1,616 | - | - | - | 32,390 | 397 | 767,017 |
| **PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage** | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1 | *Quarterly Inspection* | | | | | | | | | a | | | | | | | | | | | |
| 2b.1.2 | Semi-annual environmental survey | | | | | | | | | a | | | | | | | | | | | |
| 2b.1.3 | Prepare reports | | | | | | | | | a | | | | | | | | | | | |
| 2b.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 1,780 | 267 | 2,047 | 2,047 | - | - | - | - | - | - | - | - | - | - |
| 2b.1.5 | Maintenance supplies | - | - | - | - | - | - | 3,152 | 788 | 3,941 | 3,941 | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | - | - | - | - | - | - | 4,932 | 1,055 | 5,988 | 5,988 | - | - | - | - | - | - | - | - | - | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 3,686 | 553 | 4,239 | - | 4,239 | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | - | - | - | - | - | - | 3,686 | 553 | 4,239 | - | 4,239 | - | - | - | - | - | - | - | - | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Insurance | - | - | - | - | - | - | 12,376 | 1,238 | 13,614 | - | 13,614 | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | *Property taxes* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Health physics supplies | - | 1,612 | - | - | - | - | - | 403 | 2,015 | 2,015 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Disposal of DAW generated | - | - | 155 | 129 | - | 649 | - | 197 | 1,130 | 1,130 | - | - | - | 10,141 | - | - | - | 203,219 | 2,490 | - |
| 2b.4.5 | Plant energy budget | - | - | - | - | - | - | 1,245 | 187 | 1,432 | - | 1,432 | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | NRC Fees | - | - | - | - | - | - | 5,870 | 587 | 6,457 | 6,457 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 4,323 | 432 | 4,756 | - | 4,756 | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | Site O&M | - | - | - | - | - | - | 4,018 | 603 | 4,621 | - | 4,621 | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 2,581 | 387 | 2,969 | - | 2,969 | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Corporate Overhead | - | - | - | - | - | - | 3,759 | 564 | 4,323 | - | 4,323 | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Security Staff Cost | - | - | - | - | - | - | 37,593 | 5,639 | 43,232 | - | 43,232 | - | - | - | - | - | - | - | - | 1,046,171 |
| 2b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 63,520 | 9,528 | 73,048 | - | 73,048 | - | - | - | - | - | - | - | - | 1,150,789 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | - | 1,612 | 155 | 129 | - | 649 | 135,286 | 19,765 | 157,596 | 9,601 | 147,994 | - | - | 10,141 | - | - | - | 203,219 | 2,490 | 2,196,960 |
| 2b.0 | TOTAL PERIOD 2b COST | - | 1,612 | 155 | 129 | - | 649 | 143,905 | 21,373 | 167,823 | 15,589 | 152,234 | - | - | 10,141 | - | - | - | 203,219 | 2,490 | 2,196,960 |
| **PERIOD 2 TOTALS** | | - | 1,869 | 180 | 149 | - | 752 | 262,453 | 38,736 | 304,139 | 18,074 | 286,065 | - | - | 11,757 | - | - | - | 235,609 | 2,887 | 2,963,977 |
| **PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy** | | | | | | | | | | | | | | | | | | | | | |
| Period 3a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 124 | 19 | 142 | 142 | - | - | - | - | - | - | - | - | - | 1,235 |
| 3a.1.2 | Review plant dwgs & specs. | - | - | - | - | - | - | 437 | 66 | 503 | 503 | - | - | - | - | - | - | - | - | - | 4,370 |
| 3a.1.3 | Perform detailed rad survey | | | | | | | | | a | | | | | | | | | | | |
| 3a.1.4 | End product description | - | - | - | - | - | - | 95 | 14 | 109 | 109 | - | - | - | - | - | - | - | - | - | 950 |
| 3a.1.5 | Detailed by-product inventory | - | - | - | - | - | - | 124 | 19 | 142 | 142 | - | - | - | - | - | - | - | - | - | 1,235 |
| 3a.1.6 | Define major work sequence | - | - | - | - | - | - | 713 | 107 | 820 | 820 | - | - | - | - | - | - | - | - | - | 7,125 |

# Table A
## Pilgrim Nuclear Power Station
## SAFSTOR Decommissioning Cost Estimate
(thousands of 2005 dollars)

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3a.1.7 | Perform SER and EA | - | - | - | - | - | - | 295 | 44 | 339 | 339 | - | - | - | - | - | - | - | - | - | 2,945 |
| 3a.1.8 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 475 | 71 | 546 | 546 | - | - | - | - | - | - | - | - | - | 4,750 |
| 3a.1.9 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 389 | 58 | 448 | 448 | - | - | - | - | - | - | - | - | - | 3,891 |
| 3a.1.10 | Receive NRC approval of termination plan | | | | | | | | | a | | | | | | | | | | | |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.11.1 | Re-activate plant & temporary facilities | - | - | - | - | - | - | 700 | 105 | 805 | 725 | - | 81 | - | - | - | - | - | - | - | 7,002 |
| 3a.1.11.2 | Plant systems | - | - | - | - | - | - | 396 | 59 | 455 | 410 | - | 46 | - | - | - | - | - | - | - | 3,958 |
| 3a.1.11.3 | Reactor internals | - | - | - | - | - | - | 675 | 101 | 776 | 776 | - | - | - | - | - | - | - | - | - | 6,745 |
| 3a.1.11.4 | *Reactor vessel* | - | - | - | - | - | - | 618 | 93 | 710 | 710 | - | - | - | - | - | - | - | - | - | 6,175 |
| 3a.1.11.5 | Sacrificial shield | - | - | - | - | - | - | 48 | 7 | 55 | 55 | - | - | - | - | - | - | - | - | - | 475 |
| 3a.1.11.6 | Moisture separators/reheaters | - | - | - | - | - | - | 95 | 14 | 109 | 109 | - | - | - | - | - | - | - | - | - | 950 |
| 3a.1.11.7 | Reinforced concrete | - | - | - | - | - | - | 152 | 23 | 175 | 87 | - | 87 | - | - | - | - | - | - | - | 1,520 |
| 3a.1.11.8 | Main Turbine | - | - | - | - | - | - | 198 | 30 | 228 | 228 | - | - | - | - | - | - | - | - | - | 1,984 |
| 3a.1.11.9 | Main Condensers | - | - | - | - | - | - | 198 | 30 | 228 | 228 | - | - | - | - | - | - | - | - | - | 1,984 |
| 3a.1.11.10 | Pressure suppression structure | - | - | - | - | - | - | 190 | 29 | 219 | 219 | - | - | - | - | - | - | - | - | - | 1,900 |
| 3a.1.11.11 | Drywell | - | - | - | - | - | - | 152 | 23 | 175 | 175 | - | - | - | - | - | - | - | - | - | 1,520 |
| 3a.1.11.12 | Plant structures & buildings | - | - | - | - | - | - | 296 | 44 | 341 | 170 | - | 170 | - | - | - | - | - | - | - | 2,964 |
| 3a.1.11.13 | Waste management | - | - | - | - | - | - | 437 | 66 | 503 | 503 | - | - | - | - | - | - | - | - | - | 4,370 |
| 3a.1.11.14 | Facility & site closeout | - | - | - | - | - | - | 86 | 13 | 98 | 49 | - | 49 | - | - | - | - | - | - | - | 855 |
| 3a.1.11 | Total | - | - | - | - | - | - | 4,241 | 636 | 4,877 | 4,444 | - | 433 | - | - | - | - | - | - | - | 42,401 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.12 | Prepare dismantling sequence | - | - | - | - | - | - | 228 | 34 | 262 | 262 | - | - | - | - | - | - | - | - | - | 2,280 |
| 3a.1.13 | Plant prep. & temp. svces | - | - | - | - | - | - | 2,419 | 363 | 2,782 | 2,782 | - | - | - | - | - | - | - | - | - | - |
| 3a.1.14 | Design water clean-up system | - | - | - | - | - | - | 133 | 20 | 153 | 153 | - | - | - | - | - | - | - | - | - | 1,330 |
| 3a.1.15 | Rigging/Cont. Cntn Envlps/tooling/etc. | - | - | - | - | - | - | 2,048 | 307 | 2,355 | 2,355 | - | - | - | - | - | - | - | - | - | - |
| 3a.1.16 | Procure casks/liners & containers | - | - | - | - | - | - | 117 | 18 | 134 | 134 | - | - | - | - | - | - | - | - | - | 1,169 |
| 3a.1 | Subtotal Period 3a Activity Costs | - | - | - | - | - | - | 11,836 | 1,775 | 13,612 | 13,179 | - | 433 | - | - | - | - | - | - | - | 73,681 |
| Period 3a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.4.1 | Insurance | - | - | - | - | - | - | 468 | 47 | 515 | 515 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.2 | Property taxes | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.3 | Health physics supplies | - | 257 | - | - | - | - | - | 64 | 321 | 321 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.4 | Heavy equipment rental | - | 336 | - | - | - | - | - | 50 | 386 | 386 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.5 | Disposal of DAW generated | - | - | 6 | 5 | - | 26 | - | 8 | 45 | 45 | - | - | 404 | - | - | - | - | 8,103 | 99 | - |
| 3a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,655 | 248 | 1,904 | 1,904 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.7 | NRC Fees | - | - | - | - | - | - | 265 | 27 | 292 | 292 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.8 | Site O&M | - | - | - | - | - | - | 1,085 | 163 | 1,248 | 1,248 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.9 | Corporate Overhead | - | - | - | - | - | - | 1,499 | 225 | 1,724 | 1,724 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.10 | Security Staff Cost | - | - | - | - | - | - | 1,874 | 281 | 2,155 | 2,155 | - | - | - | - | - | - | - | - | - | 52,143 |
| 3a.4.11 | Utility Staff Cost | - | - | - | - | - | - | 14,900 | 2,235 | 17,135 | 17,135 | - | - | - | - | - | - | - | - | - | 269,579 |
| 3a.4 | Subtotal Period 3a Period-Dependent Costs | - | 593 | 6 | 5 | - | 26 | 21,747 | 3,348 | 25,726 | 25,726 | - | - | - | 404 | - | - | - | 8,103 | 99 | 321,721 |
| 3a.0 | TOTAL PERIOD 3a COST | - | 593 | 6 | 5 | - | 26 | 33,584 | 5,123 | 39,337 | 38,904 | - | 433 | - | 404 | - | - | - | 8,103 | 99 | 395,402 |
| **PERIOD 3b - Decommissioning Preparations** | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Plant systems | - | - | - | - | - | - | 450 | 67 | 517 | 465 | - | 52 | - | - | - | - | - | - | - | 4,496 |
| 3b.1.1.2 | *Reactor internals* | - | - | - | - | - | - | 380 | 57 | 437 | 437 | - | - | - | - | - | - | - | - | - | 3,800 |
| 3b.1.1.3 | Remaining buildings | - | - | - | - | - | - | 128 | 19 | 148 | 37 | - | 111 | - | - | - | - | - | - | - | 1,283 |
| 3b.1.1.4 | CRD housings & NIs | - | - | - | - | - | - | 95 | 14 | 109 | 109 | - | - | - | - | - | - | - | - | - | 950 |
| 3b.1.1.5 | Incore instrumentation | - | - | - | - | - | - | 95 | 14 | 109 | 109 | - | - | - | - | - | - | - | - | - | 950 |

# Table A
## Pilgrim Nuclear Power Station
## SAFSTOR Decommissioning Cost Estimate
**(thousands of 2005 dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detailed Work Procedures (continued) | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.6 | Removal primary containment | - | - | - | - | - | - | 190 | 29 | 219 | 219 | - | - | - | - | - | - | - | - | - | 1,900 |
| 3b.1.1.7 | *Reactor vessel* | - | - | - | - | - | - | 345 | 52 | 397 | 397 | - | - | - | - | - | - | - | - | - | 3,449 |
| 3b.1.1.8 | Facility closeout | - | - | - | - | - | - | 114 | 17 | 131 | 66 | - | 66 | - | - | - | - | - | - | - | 1,140 |
| 3b.1.1.9 | Sacrificial shield | - | - | - | - | - | - | 114 | 17 | 131 | 131 | - | - | - | - | - | - | - | - | - | 1,140 |
| 3b.1.1.10 | Reinforced concrete | - | - | - | - | - | - | 95 | 14 | 109 | 55 | - | 55 | - | - | - | - | - | - | - | 950 |
| 3b.1.1.11 | Main Turbine | - | - | - | - | - | - | 198 | 30 | 227 | 227 | - | - | - | - | - | - | - | - | - | 1,976 |
| 3b.1.1.12 | Main Condensers | - | - | - | - | - | - | 198 | 30 | 228 | 228 | - | - | - | - | - | - | - | - | - | 1,984 |
| 3b.1.1.13 | Moisture separators & reheaters | - | - | - | - | - | - | 190 | 29 | 219 | 219 | - | - | - | - | - | - | - | - | - | 1,900 |
| 3b.1.1.14 | Radwaste building | - | - | - | - | - | - | 259 | 39 | 298 | 268 | - | 30 | - | - | - | - | - | - | - | 2,594 |
| 3b.1.1.15 | Reactor building | - | - | - | - | - | - | 259 | 39 | 298 | 268 | - | 30 | - | - | - | - | - | - | - | 2,594 |
| 3b.1.1 | Total | - | - | - | - | - | - | 3,111 | 467 | 3,578 | 3,235 | - | 342 | - | - | - | - | - | - | - | 31,104 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | - | - | - | - | - | 3,111 | 467 | 3,578 | 3,235 | - | 342 | - | - | - | - | - | - | - | 31,104 |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Decon equipment | 731 | - | - | - | - | - | - | 110 | 841 | 841 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | Pipe cutting equipment | - | 957 | - | - | - | - | - | 143 | 1,100 | 1,100 | - | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | 731 | 957 | - | - | - | - | - | 253 | 1,941 | 1,941 | - | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Decon supplies | 23 | - | - | - | - | - | - | 6 | 28 | 28 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Insurance | - | - | - | - | - | - | 237 | 24 | 261 | 261 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Property taxes | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Health physics supplies | - | 130 | - | - | - | - | - | 33 | 163 | 163 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | Heavy equipment rental | - | 170 | - | - | - | - | - | 26 | 196 | 196 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Disposal of DAW generated | - | - | 3 | 3 | - | 13 | - | 4 | 23 | 23 | - | - | - | 205 | - | - | - | 4,107 | 50 | - |
| 3b.4.7 | Plant energy budget | - | - | - | - | - | - | 839 | 126 | 965 | 965 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | NRC Fees | - | - | - | - | - | - | 134 | 13 | 148 | 148 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | Site O&M | - | - | - | - | - | - | 805 | 121 | 926 | 926 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Corporate Overhead | - | - | - | - | - | - | 760 | 114 | 874 | 874 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.11 | Security Staff Cost | - | - | - | - | - | - | 950 | 142 | 1,092 | 1,092 | - | - | - | - | - | - | - | - | - | 26,429 |
| 3b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 11,260 | 1,689 | 12,949 | 12,949 | - | - | - | - | - | - | - | - | - | 200,064 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | 23 | 301 | 3 | 3 | - | 13 | 14,986 | 2,297 | 17,625 | 17,625 | - | - | - | 205 | - | - | - | 4,107 | 50 | 226,493 |
| 3b.0 | TOTAL PERIOD 3b COST | 754 | 1,257 | 3 | 3 | - | 13 | 18,097 | 3,017 | 23,144 | 22,802 | - | 342 | - | 205 | - | - | - | 4,107 | 50 | 257,597 |
| **PERIOD 3 TOTALS** | | 754 | 1,850 | 9 | 8 | - | 39 | 51,680 | 8,140 | 62,481 | 61,706 | - | 775 | - | 609 | - | - | - | 12,210 | 150 | 652,999 |
| **PERIOD 4a - Large Component Removal** | | | | | | | | | | | | | | | | | | | | | |
| Period 4a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.1.1 | Recirculation System Piping & Valves | 15 | 57 | 10 | 19 | 20 | 259 | - | 94 | 474 | 474 | - | - | 82 | 737 | - | - | - | 98,221 | 1,585 | - |
| 4a.1.1.2 | Recirculation Pumps & Motors | 8 | 36 | 14 | 39 | 45 | 264 | - | 93 | 499 | 499 | - | - | 360 | 1,609 | - | - | - | 111,100 | 1,082 | - |
| 4a.1.1.3 | *CRDMs & Nls Removal* | 31 | 120 | 243 | 105 | - | 321 | - | 166 | 986 | 986 | - | - | - | 4,306 | - | - | - | 110,306 | 3,458 | - |
| 4a.1.1.4 | Reactor Vessel Internals | 84 | 1,444 | 3,297 | 1,032 | - | 3,332 | 142 | 3,894 | 13,226 | 13,226 | - | - | - | 751 | 1,628 | 287 | - | 297,675 | 17,759 | 842 |
| 4a.1.1.5 | Vessel & Internals GTCC Disposal | - | - | 300 | - | - | 8,065 | - | 1,240 | 9,605 | 9,605 | - | - | - | - | - | - | 480 | 82,000 | - | - |
| 4a.1.1.6 | Reactor Vessel | - | 3,483 | 795 | 496 | - | 6,490 | 142 | 6,202 | 17,609 | 17,609 | - | - | - | 12,390 | - | - | - | 1,261,718 | 17,759 | 842 |
| 4a.1.1 | Totals | 138 | 5,141 | 4,659 | 1,692 | 65 | 18,732 | 285 | 11,688 | 42,399 | 42,399 | - | - | 441 | 19,794 | 1,628 | 287 | 480 | 1,961,021 | 41,643 | 1,685 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.2 | Main Turbine/Generator | - | 231 | 860 | 334 | 4,875 | 359 | - | 1,015 | 7,675 | 7,675 | - | - | 26,071 | 1,452 | - | - | - | 2,346,289 | 4,901 | - |
| 4a.1.3 | Main Condensers | - | 459 | 459 | 279 | 3,683 | 286 | - | 826 | 5,993 | 5,993 | - | - | 37,201 | 1,097 | - | - | - | 1,772,471 | 9,789 | - |

## Table A
## Pilgrim Nuclear Power Station
## SAFSTOR Decommissioning Cost Estimate
**(thousands of 2005 dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.4.1 | Reactor | - | 478 | - | - | - | - | - | 72 | 549 | 549 | - | - | - | - | - | - | - | - | 7,024 | - |
| 4a.1.4.2 | AOG Rentention | - | 24 | - | - | - | - | - | 4 | 27 | 27 | - | - | - | - | - | - | - | - | 304 | - |
| 4a.1.4.3 | Condenser Retube | - | 4 | - | - | - | - | - | 1 | 5 | 5 | - | - | - | - | - | - | - | - | 72 | - |
| 4a.1.4.4 | Main Stack & Filter | - | 4 | - | - | - | - | - | 1 | 5 | 5 | - | - | - | - | - | - | - | - | 61 | - |
| 4a.1.4.5 | Turbine | - | 210 | - | - | - | - | - | 31 | 241 | 241 | - | - | - | - | - | - | - | - | 3,354 | - |
| 4a.1.4 | Totals | - | 719 | - | - | - | - | - | 108 | 827 | 827 | - | - | - | - | - | - | - | - | 10,816 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.1 | CIRCULATING WATER | - | 72 | - | - | - | - | - | 11 | 83 | - | - | 83 | - | - | - | - | - | - | 1,585 | - |
| 4a.1.5.2 | CIRCULATING WATER (RCA) | - | 58 | 5 | 25 | 361 | - | - | 73 | 520 | 520 | - | - | 4,035 | - | - | - | - | 163,883 | 1,249 | - |
| 4a.1.5.3 | CONDENSATE | - | 250 | 7 | 37 | 543 | - | - | 150 | 987 | 987 | - | - | 6,077 | - | - | - | - | 246,780 | 5,295 | - |
| 4a.1.5.4 | CONDENSATE (RCA) | - | 414 | 20 | 103 | 1,505 | - | - | 347 | 2,389 | 2,389 | - | - | 16,843 | - | - | - | - | 684,008 | 8,719 | - |
| 4a.1.5.5 | CONDENSATE DEMINERALIZER | - | 237 | 11 | 31 | 268 | 134 | - | 139 | 820 | 820 | - | - | 2,996 | 522 | - | - | - | 167,700 | 4,992 | - |
| 4a.1.5.6 | DEMINERALIZED WATER & STORAGE | - | 19 | - | - | - | - | - | 3 | 21 | - | - | 21 | - | - | - | - | - | - | 409 | - |
| 4a.1.5.7 | DEMINERALIZED WATER & STORAGE (RCA) | - | 162 | 3 | 14 | 210 | - | - | 74 | 464 | 464 | - | - | 2,348 | - | - | - | - | 95,351 | 3,404 | - |
| 4a.1.5.8 | EXTRACTION STEAM | - | 161 | 10 | 34 | 298 | 147 | - | 128 | 778 | 778 | - | - | 3,332 | 564 | - | - | - | 185,891 | 3,471 | - |
| 4a.1.5.9 | FEEDWATER | - | 282 | 27 | 93 | 920 | 315 | - | 304 | 1,940 | 1,940 | - | - | 10,295 | 1,207 | - | - | - | 526,325 | 6,095 | - |
| 4a.1.5.10 | FEEDWATER HEATERS | - | 233 | 25 | 69 | 330 | 488 | - | 243 | 1,387 | 1,387 | - | - | 3,694 | 1,867 | - | - | - | 317,533 | 5,075 | - |
| 4a.1.5.11 | GENERATOR GAS CONTROL | - | 16 | 0 | 1 | 11 | - | - | 6 | 34 | 34 | - | - | 122 | - | - | - | - | 4,969 | 327 | - |
| 4a.1.5.12 | HEATER DRAIN | - | 193 | 9 | 28 | 232 | 128 | - | 120 | 710 | 710 | - | - | 2,598 | 490 | - | - | - | 149,407 | 4,103 | - |
| 4a.1.5.13 | LUBE OIL PURIFICATION & TRANSFER | - | 162 | 4 | 20 | 285 | - | - | 87 | 557 | 557 | - | - | 3,193 | - | - | - | - | 129,653 | 3,421 | - |
| 4a.1.5.14 | MAIN STEAM | - | 389 | 20 | 65 | 559 | 281 | - | 263 | 1,577 | 1,577 | - | - | 6,262 | 1,075 | - | - | - | 350,759 | 8,301 | - |
| 4a.1.5.15 | MAIN STEAM MOISTURE SEPARATORS | - | 203 | 61 | 165 | 792 | 1,170 | - | 493 | 2,885 | 2,885 | - | - | 8,865 | 4,481 | - | - | - | 762,080 | 4,588 | - |
| 4a.1.5.16 | MECHANICAL VACUUM | - | 49 | 2 | 9 | 136 | - | - | 34 | 231 | 231 | - | - | 1,521 | - | - | - | - | 61,779 | 1,044 | - |
| 4a.1.5.17 | NEUTRON MONITORING | - | 11 | 0 | 1 | 4 | 5 | - | 5 | 25 | 25 | - | - | 40 | 20 | - | - | - | 3,381 | 244 | - |
| 4a.1.5.18 | OFFGAS & AUGMENTED OFFGAS | - | 327 | 27 | 89 | 764 | 383 | - | 308 | 1,899 | 1,899 | - | - | 8,555 | 1,468 | - | - | - | 479,185 | 7,093 | - |
| 4a.1.5.19 | OFFGAS & AUGMENTED OFFGAS (RCA) | - | 469 | 34 | 94 | 742 | 452 | - | 359 | 2,150 | 2,150 | - | - | 8,303 | 1,756 | - | - | - | 492,482 | 9,846 | - |
| 4a.1.5.20 | POST ACCIDENT SAMPLING | - | 7 | 0 | 0 | 2 | 2 | - | 3 | 13 | 13 | - | - | 18 | 8 | - | - | - | 1,441 | 144 | - |
| 4a.1.5.21 | REACTOR CORE ISOLATION COOLING | - | 62 | 4 | 10 | 40 | 72 | - | 41 | 229 | 229 | - | - | 449 | 275 | - | - | - | 42,890 | 1,338 | - |
| 4a.1.5.22 | SEAL OIL | - | 22 | 0 | 2 | 25 | - | - | 10 | 59 | 59 | - | - | 280 | - | - | - | - | 11,370 | 456 | - |
| 4a.1.5.23 | STATOR COOLING | - | 40 | 0 | 2 | 31 | - | - | 15 | 88 | 88 | - | - | 348 | - | - | - | - | 14,124 | 834 | - |
| 4a.1.5.24 | TURBINE BUILDING CLOSED COOLING WATER | - | 241 | 3 | 14 | 200 | - | - | 93 | 550 | 550 | - | - | 2,236 | - | - | - | - | 90,795 | 5,066 | - |
| 4a.1.5 | Totals | - | 4,080 | 274 | 904 | 8,256 | 3,576 | - | 3,306 | 20,396 | 20,292 | - | 104 | 92,409 | 13,733 | - | - | - | 4,981,785 | 87,098 | - |
| 4a.1.6 | Scaffolding in support of decommissioning | - | 1,829 | 14 | 9 | 110 | 4 | - | 477 | 2,443 | 2,443 | - | - | 1,108 | 55 | - | - | - | 55,391 | 21,971 | - |
| 4a.1 | Subtotal Period 4a Activity Costs | 138 | 12,458 | 6,266 | 3,219 | 16,989 | 22,958 | 285 | 17,422 | 79,734 | 79,630 | - | 104 | 157,231 | 36,131 | 1,628 | 287 | 480 | 11,116,960 | 176,217 | 1,685 |
| Period 4a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.2.1 | Curie Surcharge (excluding RPV) | - | - | - | - | - | - | 146 | - | 36 | 182 | 182 | - | - | - | - | - | - | - | - | - | - |
| 4a.2 | Subtotal Period 4a Additional Costs | - | - | - | - | - | - | 146 | - | 36 | 182 | 182 | - | - | - | - | - | - | - | - | - | - |
| Period 4a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.3.1 | Process liquid waste | 4 | - | 3 | 3 | - | 20 | - | 8 | 38 | 38 | - | - | - | - | 55 | - | - | 6,901 | 11 | - |
| 4a.3.2 | Small tool allowance | - | 143 | - | - | - | - | - | 21 | 164 | 148 | - | 16 | - | - | - | - | - | - | - | - |
| 4a.3 | Subtotal Period 4a Collateral Costs | 4 | 143 | 3 | 3 | - | 20 | - | 29 | 202 | 186 | - | 16 | - | - | 55 | - | - | 6,901 | 11 | - |
| Period 4a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.4.1 | Decon supplies | 34 | - | - | - | - | - | - | 8 | 42 | 42 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.2 | Insurance | - | - | - | - | - | - | 356 | 36 | 391 | 391 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.3 | Property taxes | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.4 | Health physics supplies | - | 816 | - | - | - | - | - | 204 | 1,020 | 1,020 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.5 | Heavy equipment rental | - | 1,242 | - | - | - | - | - | 186 | 1,429 | 1,429 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.6 | Disposal of DAW generated | - | - | 53 | 44 | - | 221 | - | 67 | 385 | 385 | - | - | - | 3,452 | - | - | - | 69,176 | 848 | - |
| 4a.4.7 | Plant energy budget | - | - | - | - | - | - | 1,193 | 179 | 1,372 | 1,372 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.8 | NRC Fees | - | - | - | - | - | - | 249 | 25 | 273 | 273 | - | - | - | - | - | - | - | - | - | - |

# Table A
## Pilgrim Nuclear Power Station
## SAFSTOR Decommissioning Cost Estimate
### (thousands of 2005 dollars)

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes Class A Cu. Feet | Burial Volumes Class B Cu. Feet | Burial Volumes Class C Cu. Feet | Burial Volumes GTCC Cu. Feet | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period 4a Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 4a.4.9 | Site O&M | - | - | - | - | - | - | 1,589 | 238 | 1,828 | 1,828 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.10 | Radwaste Processing Equipment/Services | - | - | - | - | - | - | 281 | 42 | 323 | 323 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.11 | Corporate Overhead | - | - | - | - | - | - | 1,138 | 171 | 1,308 | 1,308 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.12 | Security Staff Cost | - | - | - | - | - | - | 1,422 | 213 | 1,635 | 1,635 | - | - | - | - | - | - | - | - | - | 39,571 |
| 4a.4.13 | Utility Staff Cost | - | - | - | - | - | - | 18,722 | 2,808 | 21,530 | 21,530 | - | - | - | - | - | - | - | - | - | 339,523 |
| 4a.4 | Subtotal Period 4a Period-Dependent Costs | 34 | 2,058 | 53 | 44 | - | 221 | 24,949 | 4,178 | 31,537 | 31,537 | - | - | - | 3,452 | - | - | - | 69,176 | 848 | 379,094 |
| 4a.0 | TOTAL PERIOD 4a COST | 176 | 14,659 | 6,321 | 3,265 | 16,989 | 23,344 | 25,234 | 21,665 | 111,655 | 111,534 | - | 121 | 157,231 | 39,583 | 1,682 | 287 | 480 | 11,193,030 | 177,075 | 380,779 |
| **PERIOD 4b - Site Decontamination** | | | | | | | | | | | | | | | | | | | | | |
| Period 4b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.1 | Remove spent fuel racks | 659 | 67 | 107 | 230 | - | 2,433 | - | 1,000 | 4,498 | 4,498 | - | - | - | 9,319 | - | - | - | 836,155 | 1,563 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.1 | CONTAINMENT ATMOSPHERIC CONTROL | - | 122 | 9 | 29 | 275 | 113 | - | 105 | 654 | 654 | - | - | 3,076 | 436 | - | - | - | 163,649 | 2,622 | - |
| 4b.1.2.2 | CONTROL ROD DRIVE HYDRAULIC | - | 538 | 32 | 55 | 158 | 463 | - | 285 | 1,531 | 1,531 | - | - | 1,766 | 1,775 | - | - | - | 230,804 | 10,790 | - |
| 4b.1.2.3 | CORE SPRAY | - | 110 | 4 | 13 | 119 | 50 | - | 60 | 356 | 356 | - | - | 1,330 | 192 | - | - | - | 71,209 | 2,361 | - |
| 4b.1.2.4 | DIESEL FUEL OIL STORAGE & TRANSFER | - | 28 | - | - | - | - | - | 4 | 32 | - | - | 32 | - | - | - | - | - | - | 603 | - |
| 4b.1.2.5 | DIESEL FUEL OIL STORAGE & TRANSFER (RCA) | - | 12 | 0 | 1 | 19 | - | - | 6 | 38 | 38 | - | - | 208 | - | - | - | - | 8,428 | 255 | - |
| 4b.1.2.6 | DIESEL GENERATOR & AUXILIARIES | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | 118 | - |
| 4b.1.2.7 | ELECTRICAL CLEAN | - | 336 | - | - | - | - | - | 50 | 386 | - | - | 386 | - | - | - | - | - | - | 7,450 | - |
| 4b.1.2.8 | ELECTRICAL CONTAMINATED | - | 79 | 2 | 5 | 25 | 37 | - | 34 | 183 | 183 | - | - | 285 | 141 | - | - | - | 24,237 | 1,706 | - |
| 4b.1.2.9 | ELECTRICAL RCA | - | 2,914 | 30 | 160 | 2,330 | - | - | 1,105 | 6,539 | 6,539 | - | - | 26,081 | - | - | - | - | 1,059,160 | 62,880 | - |
| 4b.1.2.10 | FIRE PROTECTION | - | 16 | - | - | - | - | - | 2 | 18 | - | - | 18 | - | - | - | - | - | - | 351 | - |
| 4b.1.2.11 | FIRE PROTECTION (RCA) | - | 92 | 1 | 7 | 108 | - | - | 40 | 250 | 250 | - | - | 1,211 | - | - | - | - | 49,177 | 1,882 | - |
| 4b.1.2.12 | FUEL POOL COOLING & DEMINERALIZER | - | 604 | 15 | 29 | 91 | 244 | - | 231 | 1,214 | 1,214 | - | - | 1,024 | 934 | - | - | - | 125,357 | 13,265 | - |
| 4b.1.2.13 | HIGH PRESSURE COOLANT INJECTION | - | 158 | 12 | 38 | 338 | 160 | - | 137 | 844 | 844 | - | - | 3,787 | 614 | - | - | - | 208,894 | 3,408 | - |
| 4b.1.2.14 | HVAC DIESEL GENERATOR | - | 3 | - | - | - | - | - | 0 | 3 | - | - | 3 | - | - | - | - | - | - | 56 | - |
| 4b.1.2.15 | HVAC OFF GAS RENTENTION | - | 595 | 26 | 72 | 530 | 380 | - | 337 | 1,940 | 1,940 | - | - | 5,930 | 1,456 | - | - | - | 371,375 | 12,580 | - |
| 4b.1.2.16 | HVAC OTHER | - | 337 | - | - | - | - | - | 51 | 387 | - | - | 387 | - | - | - | - | - | - | 7,683 | - |
| 4b.1.2.17 | HVAC RADWASTE | - | 520 | 23 | 48 | 137 | 407 | - | 262 | 1,396 | 1,396 | - | - | 1,528 | 1,558 | - | - | - | 201,755 | 10,896 | - |
| 4b.1.2.18 | HVAC REACTOR | - | 3,561 | 196 | 565 | 4,640 | 2,616 | - | 2,345 | 13,923 | 13,923 | - | - | 51,939 | 10,025 | - | - | - | 3,008,290 | 74,852 | - |
| 4b.1.2.19 | HVAC TURBINE | - | 3,214 | 190 | 584 | 5,038 | 2,522 | - | 2,296 | 13,844 | 13,844 | - | - | 56,387 | 9,664 | - | - | - | 3,156,705 | 68,040 | - |
| 4b.1.2.20 | INSTRUMENT AIR | - | 140 | 2 | 8 | 121 | - | - | 55 | 325 | 325 | - | - | 1,356 | - | - | - | - | 55,057 | 2,754 | - |
| 4b.1.2.21 | NUCLEAR BOILER | - | 125 | 33 | 71 | 295 | 535 | - | 223 | 1,281 | 1,281 | - | - | 3,297 | 2,049 | - | - | - | 317,636 | 2,793 | - |
| 4b.1.2.22 | POTABLE WATER | - | 105 | 2 | 9 | 130 | - | - | 47 | 293 | 293 | - | - | 1,457 | - | - | - | - | 59,155 | 2,153 | - |
| 4b.1.2.23 | RADWASTE COLLECTION | - | 3,677 | 104 | 213 | 497 | 1,895 | - | 1,510 | 7,896 | 7,896 | - | - | 5,559 | 7,780 | - | - | - | 877,051 | 80,526 | - |
| 4b.1.2.24 | REACTOR BUILDING CLOSED COOLING WATER | - | 265 | 15 | 40 | 313 | 198 | - | 170 | 1,001 | 1,001 | - | - | 3,507 | 759 | - | - | - | 210,433 | 5,570 | - |
| 4b.1.2.25 | REACTOR WATER CLEAN UP | - | 129 | 11 | 24 | 78 | 200 | - | 99 | 541 | 541 | - | - | 875 | 768 | - | - | - | 104,158 | 2,739 | - |
| 4b.1.2.26 | RESIDUAL HEAT REMOVAL | - | 394 | 34 | 88 | 433 | 612 | - | 333 | 1,894 | 1,894 | - | - | 4,848 | 2,346 | - | - | - | 407,296 | 8,591 | - |
| 4b.1.2.27 | ROOF DRAINS | - | 8 | - | - | - | - | - | 1 | 9 | - | - | 9 | - | - | - | - | - | - | 190 | - |
| 4b.1.2.28 | RX RECIRC MOTOR GENERATOR AUXILIARIES | - | 94 | 3 | 14 | 204 | - | - | 57 | 372 | 372 | - | - | 2,284 | - | - | - | - | 92,751 | 2,032 | - |
| 4b.1.2.29 | SERVICE AIR | - | 231 | 3 | 15 | 212 | - | - | 92 | 552 | 552 | - | - | 2,371 | - | - | - | - | 96,288 | 4,801 | - |
| 4b.1.2.30 | SERVICE WATER | - | 41 | - | - | - | - | - | 6 | 48 | - | - | 48 | - | - | - | - | - | - | 933 | - |
| 4b.1.2.31 | SERVICE WATER (RCA) | - | 527 | 15 | 75 | 1,089 | - | - | 308 | 2,013 | 2,013 | - | - | 12,187 | - | - | - | - | 494,923 | 10,678 | - |
| 4b.1.2.32 | STANDBY GAS TREATMENT | - | 90 | 4 | 14 | 128 | 56 | - | 58 | 351 | 351 | - | - | 1,433 | 214 | - | - | - | 77,361 | 1,897 | - |
| 4b.1.2.33 | STANDBY LIQUID CONTROL | - | 47 | 2 | 6 | 70 | 17 | - | 28 | 170 | 170 | - | - | 784 | 66 | - | - | - | 37,553 | 1,001 | - |
| 4b.1.2 | Totals | - | 19,118 | 765 | 2,184 | 17,378 | 10,504 | - | 10,339 | 60,289 | 59,400 | - | 889 | 194,507 | 40,778 | - | - | - | 11,508,700 | 408,455 | - |
| 4b.1.3 | Scaffolding in support of decommissioning | - | 2,743 | 21 | 14 | 165 | 6 | - | 716 | 3,665 | 3,665 | - | - | 1,662 | 83 | - | - | - | 83,086 | 32,956 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.4.1 | Reactor | 3,594 | 2,331 | 126 | 414 | 4,582 | 357 | - | 3,231 | 14,634 | 14,634 | - | - | 51,283 | 4,745 | - | - | - | 2,551,935 | 120,649 | - |
| 4b.1.4.2 | AOG Rentention | 41 | 33 | 3 | 7 | 22 | 15 | - | 37 | 159 | 159 | - | - | 247 | 208 | - | - | - | 30,337 | 1,501 | - |
| 4b.1.4.3 | Condenser Retube | 53 | 23 | 4 | 10 | 3 | 24 | - | 40 | 157 | 157 | - | - | 32 | 317 | - | - | - | 32,928 | 1,518 | - |

## Table A
## Pilgrim Nuclear Power Station
## SAFSTOR Decommissioning Cost Estimate
### (thousands of 2005 dollars)

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes Class A Cu. Feet | Burial Volumes Class B Cu. Feet | Burial Volumes Class C Cu. Feet | Burial Volumes GTCC Cu. Feet | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Decontamination of Site Buildings (continued) | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.4.4 | Main Stack & Filter | 12 | 11 | 1 | 3 | 5 | 7 | - | 12 | 53 | 53 | - | - | 60 | 100 | - | - | - | 12,256 | 469 | - |
| 4b.1.4.5 | Radwaste | 157 | 110 | 16 | 36 | 51 | 81 | - | 141 | 592 | 592 | - | - | 567 | 1,204 | - | - | - | 130,144 | 5,373 | - |
| 4b.1.4.6 | Turbine | 397 | 244 | 30 | 81 | 188 | 175 | - | 347 | 1,463 | 1,463 | - | - | 2,102 | 2,328 | - | - | - | 315,404 | 12,839 | - |
| 4b.1.4.7 | Spent Fuel Pool Area | 199 | 1,198 | 330 | 775 | 75 | 5,050 | - | 1,822 | 9,448 | 9,448 | - | - | 840 | 28,318 | - | - | - | 2,705,126 | 26,317 | - |
| 4b.1.4 | Totals | 4,453 | 3,951 | 510 | 1,326 | 4,926 | 5,710 | - | 5,630 | 26,505 | 26,505 | - | - | 55,131 | 37,219 | - | - | - | 5,778,131 | 168,667 | - |
| 4b.1 | Subtotal Period 4b Activity Costs | 5,112 | 25,881 | 1,404 | 3,754 | 22,468 | 18,653 | - | 17,686 | 94,957 | 94,068 | - | 889 | 251,300 | 87,399 | - | - | - | 18,206,070 | 611,640 | - |
| Period 4b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 4b.2.1 | ISFSI License Termination | - | 1,193 | 11 | 274 | - | 1,027 | 1,417 | 810 | 4,732 | - | 4,732 | - | - | 11,609 | - | - | - | 1,136,593 | 17,786 | 2,560 |
| 4b.2.2 | AOG Filter Media Disposal | - | - | 50 | 66 | - | 140 | - | 50 | 305 | 305 | - | - | - | 4,060 | - | - | - | 48,720 | 380 | - |
| 4b.2 | Subtotal Period 4b Additional Costs | - | 1,193 | 60 | 340 | - | 1,167 | 1,417 | 859 | 5,036 | 305 | 4,732 | - | - | 15,669 | - | - | - | 1,185,313 | 18,166 | 2,560 |
| Period 4b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4b.3.1 | Process liquid waste | 16 | - | 12 | 11 | - | 78 | - | 30 | 147 | 147 | - | - | - | - | 213 | - | - | 26,811 | 42 | - |
| 4b.3.2 | Small tool allowance | - | 501 | - | - | - | - | - | 75 | 576 | 576 | - | - | - | - | - | - | - | - | - | - |
| 4b.3 | Subtotal Period 4b Collateral Costs | 16 | 501 | 12 | 11 | - | 78 | - | 105 | 723 | 723 | - | - | - | - | 213 | - | - | 26,811 | 42 | - |
| Period 4b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4b.4.1 | Decon supplies | 987 | - | - | - | - | - | - | 247 | 1,234 | 1,234 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.2 | Insurance | - | - | - | - | - | - | 1,395 | 140 | 1,535 | 1,535 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.3 | Property taxes | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.4 | Health physics supplies | - | 2,984 | - | - | - | - | - | 746 | 3,730 | 3,730 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.5 | Heavy equipment rental | - | 4,905 | - | - | - | - | - | 736 | 5,640 | 5,640 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.6 | Disposal of DAW generated | - | - | 163 | 135 | - | 683 | - | 207 | 1,188 | 1,188 | - | - | - | 10,666 | - | - | - | 213,733 | 2,619 | - |
| 4b.4.7 | Plant energy budget | - | - | - | - | - | - | 3,697 | 555 | 4,252 | 4,252 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.8 | NRC Fees | - | - | - | - | - | - | 976 | 98 | 1,073 | 1,073 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.9 | Site O&M | - | - | - | - | - | - | 5,401 | 810 | 6,211 | 6,211 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.10 | Radwaste Processing Equipment/Services | - | - | - | - | - | - | 1,104 | 166 | 1,269 | 1,269 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.11 | Corporate Overhead | - | - | - | - | - | - | 4,464 | 670 | 5,134 | 5,134 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.12 | Security Staff Cost | - | - | - | - | - | - | 5,580 | 837 | 6,417 | 6,417 | - | - | - | - | - | - | - | - | - | 155,286 |
| 4b.4.13 | Utility Staff Cost | - | - | - | - | - | - | 64,896 | 9,734 | 74,630 | 74,630 | - | - | - | - | - | - | - | - | - | 1,153,773 |
| 4b.4 | Subtotal Period 4b Period-Dependent Costs | 987 | 7,889 | 163 | 135 | - | 683 | 87,512 | 14,944 | 112,313 | 112,313 | - | - | - | 10,666 | - | - | - | 213,733 | 2,619 | 1,309,059 |
| 4b.0 | TOTAL PERIOD 4b COST | 6,115 | 35,463 | 1,639 | 4,240 | 22,468 | 20,581 | 88,929 | 33,595 | 213,030 | 207,409 | 4,732 | 889 | 251,300 | 113,734 | 213 | - | - | 19,631,930 | 632,466 | 1,311,619 |
| **PERIOD 4e - License Termination** | | | | | | | | | | | | | | | | | | | | | |
| Period 4e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 4e.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 123 | 37 | 160 | 160 | - | - | - | - | - | - | - | - | - | - |
| 4e.1.2 | Terminate license | | | | | | | | | a | | | | | | | | | | | |
| 4e.1 | Subtotal Period 4e Activity Costs | - | - | - | - | - | - | 123 | 37 | 160 | 160 | - | - | - | - | - | - | - | - | - | - |
| Period 4e Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 4e.2.1 | License Termination Survey | - | - | - | - | - | - | 5,347 | 1,604 | 6,951 | 6,951 | - | - | - | - | - | - | - | - | 105,930 | - |
| 4e.2 | Subtotal Period 4e Additional Costs | - | - | - | - | - | - | 5,347 | 1,604 | 6,951 | 6,951 | - | - | - | - | - | - | - | - | 105,930 | - |
| Period 4e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4e.4.1 | Insurance | - | - | - | - | - | - | 347 | 35 | 381 | 381 | - | - | - | - | - | - | - | - | - | - |
| 4e.4.2 | Property taxes | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4e.4.3 | Health physics supplies | - | 563 | - | - | - | - | - | 141 | 704 | 704 | - | - | - | - | - | - | - | - | - | - |
| 4e.4.4 | Disposal of DAW generated | - | - | 5 | 4 | - | 19 | - | 6 | 33 | 33 | - | - | - | 299 | - | - | - | 5,994 | 73 | - |
| 4e.4.5 | Plant energy budget | - | - | - | - | - | - | 245 | 37 | 282 | 282 | - | - | - | - | - | - | - | - | - | - |
| 4e.4.6 | NRC Fees | - | - | - | - | - | - | 242 | 24 | 267 | 267 | - | - | - | - | - | - | - | - | - | - |
| 4e.4.7 | Site O&M | - | - | - | - | - | - | 612 | 92 | 704 | 704 | - | - | - | - | - | - | - | - | - | - |
| 4e.4.8 | Corporate Overhead | - | - | - | - | - | - | 1,109 | 166 | 1,275 | 1,275 | - | - | - | - | - | - | - | - | - | - |

## Table A
## Pilgrim Nuclear Power Station
## SAFSTOR Decommissioning Cost Estimate
(thousands of 2005 dollars)

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period 4e Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 4e.4.9 | Security Staff Cost | - | - | - | - | - | - | 499 | 75 | 574 | 574 | - | - | - | - | - | - | - | - | - | 13,886 |
| 4e.4.10 | Utility Staff Cost | - | - | - | - | - | - | 7,754 | 1,163 | 8,917 | 8,917 | - | - | - | - | - | - | - | - | - | 130,757 |
| 4e.4 | Subtotal Period 4e Period-Dependent Costs | - | 563 | 5 | 4 | - | 19 | 10,807 | 1,738 | 13,136 | 13,136 | - | - | - | 299 | - | - | - | 5,994 | 73 | 144,643 |
| 4e.0 | TOTAL PERIOD 4e COST | - | 563 | 5 | 4 | - | 19 | 16,277 | 3,379 | 20,247 | 20,247 | - | - | - | 299 | - | - | - | 5,994 | 106,003 | 144,643 |
| **PERIOD 4 TOTALS** | | 6,291 | 50,686 | 7,965 | 7,509 | 39,457 | 43,944 | 130,441 | 58,639 | 344,932 | 339,190 | 4,732 | 1,010 | 408,531 | 153,616 | 1,895 | 287 | 480 | 30,830,960 | 915,545 | 1,837,040 |
| **PERIOD 5b - Site Restoration** | | | | | | | | | | | | | | | | | | | | | |
| Period 5b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.1.1 | Reactor | - | 2,785 | - | - | - | - | - | 418 | 3,203 | - | - | 3,203 | - | - | - | - | - | - | 41,618 | - |
| 5b.1.1.2 | AOG Rentention | - | 218 | - | - | - | - | - | 33 | 250 | - | - | 250 | - | - | - | - | - | - | 2,846 | - |
| 5b.1.1.3 | Condenser Retube | - | 48 | - | - | - | - | - | 7 | 55 | - | - | 55 | - | - | - | - | - | - | 841 | - |
| 5b.1.1.4 | Contractor Office - Warehouse | - | 113 | - | - | - | - | - | 17 | 130 | - | - | 130 | - | - | - | - | - | - | 1,661 | - |
| 5b.1.1.5 | Diesel Generator | - | 159 | - | - | - | - | - | 24 | 183 | - | - | 183 | - | - | - | - | - | - | 2,594 | - |
| 5b.1.1.6 | Discharge Structure & Channels | - | 2 | - | - | - | - | - | 0 | 3 | - | - | 3 | - | - | - | - | - | - | 18 | - |
| 5b.1.1.7 | Engineering & Plant Support | - | 282 | - | - | - | - | - | 42 | 324 | - | - | 324 | - | - | - | - | - | - | 4,131 | - |
| 5b.1.1.8 | Fencing & Pavement | - | 801 | - | - | - | - | - | 120 | 921 | - | - | 921 | - | - | - | - | - | - | 12,411 | - |
| 5b.1.1.9 | Intake Structure | - | 171 | - | - | - | - | - | 26 | 197 | - | - | 197 | - | - | - | - | - | - | 2,336 | - |
| 5b.1.1.10 | Main Stack & Filter | - | 35 | - | - | - | - | - | 5 | 41 | - | - | 41 | - | - | - | - | - | - | 550 | - |
| 5b.1.1.11 | Miscellaneous Site Structures | - | 2,029 | - | - | - | - | - | 304 | 2,333 | - | - | 2,333 | - | - | - | - | - | - | 29,121 | - |
| 5b.1.1.12 | Radwaste | - | 475 | - | - | - | - | - | 71 | 546 | - | - | 546 | - | - | - | - | - | - | 7,651 | - |
| 5b.1.1.13 | SSW Pipe Vault | - | 5 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | 68 | - |
| 5b.1.1.14 | Switchyard | - | 13 | - | - | - | - | - | 2 | 15 | - | - | 15 | - | - | - | - | - | - | 245 | - |
| 5b.1.1.15 | Transformer Pads | - | 34 | - | - | - | - | - | 5 | 39 | - | - | 39 | - | - | - | - | - | - | 556 | - |
| 5b.1.1.16 | Turbine | - | 1,976 | - | - | - | - | - | 296 | 2,272 | - | - | 2,272 | - | - | - | - | - | - | 32,182 | - |
| 5b.1.1.17 | Turbine Pedestal | - | 500 | - | - | - | - | - | 75 | 575 | - | - | 575 | - | - | - | - | - | - | 6,128 | - |
| 5b.1.1 | Totals | - | 9,647 | - | - | - | - | - | 1,447 | 11,094 | - | - | 11,094 | - | - | - | - | - | - | 144,957 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.2 | BackFill Site | - | 697 | - | - | - | - | - | 105 | 801 | - | - | 801 | - | - | - | - | - | - | 2,627 | - |
| 5b.1.3 | Grade & landscape site | - | 53 | - | - | - | - | - | 8 | 60 | - | - | 60 | - | - | - | - | - | - | 185 | - |
| 5b.1.4 | Final report to NRC | - | - | - | - | - | - | 148 | 22 | 170 | 170 | - | - | - | - | - | - | - | - | - | 1,482 |
| 5b.1 | Subtotal Period 5b Activity Costs | - | 10,396 | - | - | - | - | 148 | 1,582 | 12,126 | 170 | - | 11,955 | - | - | - | - | - | - | 147,769 | 1,482 |
| Period 5b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 5b.2.1 | ISFSI Demolition | - | 1,025 | - | - | - | - | 41 | 160 | 1,226 | - | 1,226 | - | - | - | - | - | - | - | 4,128 | 160 |
| 5b.2.2 | Intake and Discharge Cofferdam | - | 377 | - | - | - | - | - | 57 | 433 | - | - | 433 | - | - | - | - | - | - | 4,572 | - |
| 5b.2.3 | Concrete Crushing | - | 330 | - | - | - | - | 6 | 50 | 387 | - | - | 387 | - | - | - | - | - | - | 1,952 | - |
| 5b.2 | Subtotal Period 5b Additional Costs | - | 1,732 | - | - | - | - | 47 | 267 | 2,046 | - | 1,226 | 820 | - | - | - | - | - | - | 10,652 | 160 |
| Period 5b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 5b.3.1 | Small tool allowance | - | 126 | - | - | - | - | - | 19 | 145 | - | - | 145 | - | - | - | - | - | - | - | - |
| 5b.3 | Subtotal Period 5b Collateral Costs | - | 126 | - | - | - | - | - | 19 | 145 | - | - | 145 | - | - | - | - | - | - | - | - |
| Period 5b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 5b.4.1 | Insurance | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5b.4.2 | Property taxes | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5b.4.3 | Heavy equipment rental | - | 2,829 | - | - | - | - | - | 424 | 3,253 | - | - | 3,253 | - | - | - | - | - | - | - | - |
| 5b.4.4 | Plant energy budget | - | - | - | - | - | - | 207 | 31 | 238 | - | - | 238 | - | - | - | - | - | - | - | - |
| 5b.4.5 | Site O&M | - | - | - | - | - | - | 664 | 100 | 763 | 763 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.6 | Corporate Overhead | - | - | - | - | - | - | 1,877 | 282 | 2,158 | - | - | 2,158 | - | - | - | - | - | - | - | - |
| 5b.4.7 | Security Staff Cost | - | - | - | - | - | - | 845 | 127 | 971 | - | - | 971 | - | - | - | - | - | - | - | 23,503 |

# Table A
## Pilgrim Nuclear Power Station
## SAFSTOR Decommissioning Cost Estimate
### (thousands of 2005 dollars)

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 5b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 5b.4.8 | Utility Staff Cost | - | - | - | - | - | - | 11,064 | 1,660 | 12,724 | - | - | 12,724 | - | - | - | - | - | - | - | 185,411 |
| 5b.4 | Subtotal Period 5b Period-Dependent Costs | - | 2,829 | - | - | - | - | 14,656 | 2,623 | 20,108 | 763 | - | 19,344 | - | - | - | - | - | - | - | 208,914 |
| 5b.0 | TOTAL PERIOD 5b COST | - | 15,083 | - | - | - | - | 14,852 | 4,490 | 34,424 | 934 | 1,226 | 32,265 | - | - | - | - | - | - | 158,421 | 210,556 |
| **PERIOD 5 TOTALS** | | - | 15,083 | - | - | - | - | 14,852 | 4,490 | 34,424 | 934 | 1,226 | 32,265 | - | - | - | - | - | - | 158,421 | 210,556 |
| TOTAL COST TO DECOMMISSION | | 13,841 | 74,595 | 8,286 | 8,030 | 39,457 | 45,443 | 543,135 | 127,095 | 859,883 | 517,240 | 308,593 | 34,050 | 408,531 | 194,998 | 3,313 | 287 | 480 | 31,320,610 | 1,246,346 | 6,590,199 |

| | | |
|---|---|---|
| **TOTAL COST TO DECOMMISSION WITH 17.34% CONTINGENCY:** | **$859,883** | **thousands of 2005 dollars** |
| **TOTAL NRC LICENSE TERMINATION COST IS 60.15% OR:** | **$517,240** | **thousands of 2005 dollars** |
| **SPENT FUEL MANAGEMENT COST IS 35.89% OR:** | **$308,593** | **thousands of 2005 dollars** |
| **NON-NUCLEAR DEMOLITION COST IS 3.96% OR:** | **$34,050** | **thousands of 2005 dollars** |
| **TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC):** | **198,599** | **cubic feet** |
| **TOTAL GREATER THAN CLASS C VOLUME GENERATED:** | **480** | **cubic feet** |
| **TOTAL SCRAP METAL REMOVED:** | **14,569** | **tons** |
| **TOTAL CRAFT LABOR REQUIREMENTS:** | **1,246,346** | **man-hours** |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense.
a - indicates that this activity performed by decommissioning staff.
0 - indicates that this value is less than 0.5 but is non-zero.
a cell containing " - " indicates a zero value